Public Works Officers Guide:

Asbestos and Lead Management In Facilities

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May 2002

PREFACE: This Guide was developed for Public Works Officers and Public Works Departments to manage asbestos and lead in facilities. It provides a summary of asbestos and lead requirements that routinely impact facilities operations. The format follows a logical sequence of work processes in a Public Works Department. The overall intent is to ensure protection of our workers, building occupants, and the environment.

This Guide was developed as part of the Navy Leadership Development Initiative by Thom Snyder, Industrial Hygienist, April 2001. Revision 1 was completed in May 2002.

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PWO Guide: Asbestos and Lead

1.0 Overview

The purpose of this guide is to assist Public Works Officers (PWO's) in the management of asbestos and lead containing building materials and products. Protection of workers, building occupants, and the environment are critical elements of facilities work. Although asbestos and lead are primarily Navy Occupational Safety and Health (NAVOSH) and Environmental Program issues, most Public Works Department programs and projects are impacted, including; maintenance, repair, renovation, demolition, work requests, in-house work, service and other contracts, credit card purchases, and self-help projects. This PWO Guide focuses on the facilities management aspects dealing with asbestos and lead. It does not include other industrial or military unique operations where asbestos or lead may be encountered. Other environmental program aspects, such as asbestos and lead in drinking water, are also not included.

Asbestos and lead are regulated by both the US Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA). EPA regulates training, notifications, material handling, and waste disposal for both materials. These federal regulations require that most building materials are presumed to contain asbestos and paints contain lead. These materials are not to be disturbed without special worker and environmental precautions. EPA has additional regulations for lead-based paint (LBP) that specifically apply to housing and child-occupied facilities (i.e., Child Development Centers). OSHA regulations focus on worker protection, training, and work practices. State or local governments may have more stringent applicable asbestos and lead regulations. Consult with legal counsel to determine the applicability and more stringent provisions of State/local regulations.

In general, Navy policy for asbestos and lead is to manage these materials in-place provided that they are in good condition and will not be disturbed. Navy policy for asbestos is contained in OPNAV Instruction 5100.23 series, Chapter 17 *Navy Occupational Safety and Health (NAVOSH) Program Manual*. Environmental and facilities management requirements are included in this instruction. Naval Facilities Engineering Command (NAVFAC) guidance for lead-based paint (LBP) has been issued through the housing program, Design Policy Letters. The NAVOSH Manual, Chapter 21 contains the Navy worker protection and some facility related requirements. Navy policy also requires following the appropriate EPA and OSHA regulations for facilities work that will disturb these materials.

This guide combines the regulatory requirements, Navy policy, and technical guidance into a cost-effective approach to facilities management of asbestos and lead. Appendix A contains Architectural/Engineering firm guidance and a scope of work, Appendix B includes asbestos and lead checklist as Appendix B, internet web site information as Appendix C, and resource points of contact as Appendix D.

2.0 Asbestos

2.1 Background

Asbestos was used in more than 3,000 commercial products because of its excellent heat and acid resistance, and electrically nonconductive properties. Numerous building materials may contain asbestos, which include: Roofing, Siding, Flooring, Plasters, Joint Compound, Mastics, Ceiling Panels, Caulking, Glazing, Putty, Sealants, Textured & Roofing Paints, High Voltage Electrical Insulation, Pipe and Boiler Insulation Products, and Gaskets. Asbestos-containing materials (ACM) are primarily a health hazard when fibers become airborne. Long term exposures are mostly associated with the diseases that take 20 years or more to develop. Asbestos fibers that cause health problems are invisible to the naked eye.

This section of the guide covers the background, regulatory, Navy guidance and requirements for asbestos. The most pertinent facility-related regulatory requirements have been included. There are additional requirements within each of the regulations that may apply. The Activity NAVOSH and Environmental Departments or Engineering Field Division/Activity (EFD/A) Safety or Environmental Offices should be able to provide technical support for these requirements and interpretations.

The facilities management section, which follows, applies the regulations and Navy guidance/ requirements to various public works functions (maintenance, repair, renovation or demolition work). Although the facilities management section applies the requirements to functions, they are also interdependent and build upon each other. The facilities section includes the requirements for an in-house asbestos removal team.

An Asbestos Hazard Management Matrix is provided at the end of the asbestos section that summarizes the key facilities-related subjects, requirements, provisions and actions. A Facilities Asbestos Management Process provides a flow chart for managing asbestos work in public works by following a work request through the process.

2.2 Regulatory Requirements

2.2.1 Federal Regulatory Requirements

Asbestos is regulated by both the EPA and OSHA. The EPA regulations focus on minimizing releases to the environment during renovation and demolition, worker training and accreditation, project notification, and asbestos waste disposal. OSHA regulations primarily address worker safety and work methods. Protection of building occupants is addressed by the NAVOSH program and State/Local regulations. EPA and OSHA may actually differ in their requirements for sampling, handling and disposal of certain asbestos materials. A thorough reading of the regulatory text is necessary to ensure full compliance.

2.2.1.1 40 CFR 61 Subpart M - National Emission Standard for Asbestos. The National Emission Standard for Asbestos is a subpart to a broader class of Clean Air Act requirements for hazardous air pollutants called NESHAPs. The Asbestos NESHAP is primarily concerned with the application, renovation, demolition and disposal of asbestos containing material (ACM). The regulation defines ACM as greater than 1% of the sample area as measured by polarized light microscopy. The Asbestos NESHAP requirements include:

- project specific surveys
- written notification prior to renovation or demolition work
- destructive testing for demolition (or renovation with demolition)
- wetting of ACM during removal
- proper disposal of waste, including Waste Shipment Records

2.2.1.2. 40 CFR 763 Subpart E, Appendix C - Asbestos Hazard Emergency Response Act (AHERA), Model Accreditation Plan (MAP). While the 40 CFR 763 regulations state that they are only applicable to schools, kindergarten through 12th grade, the 1990 reauthorization extended accreditation requirements of the MAP to include personnel in public and commercial buildings. The MAP outlines training and accreditation requirements for inspectors, management planners, project designers, abatement supervisors, and abatement workers. Only accredited persons are allowed to:

- collect bulk samples
- design projects (prepare/review plans & specs)
- remove asbestos
- supervise asbestos removal projects

AHERA also outlines the training required for custodial and maintenance workers, not covered by OSHA regulations, who may disturb ACM or work in buildings with ACM (40 CFR 763.92(a)).

2.2.1.3 29 CFR 1926.1101 Construction Industry Standard, Asbestos. OSHA's construction industry standard covers employees engaged in construction and demolition, as well as the following related activities which are likely to involve asbestos exposure: removal, encapsulation, alteration, repair, maintenance, installation, insulation, spill/emergency clean-up, transportation, storage and disposal of ACM.

In general, the construction industry standard includes requirements for:

- training (equivalent to training requirements of EPA/AHERA)
- engineering controls
- work practices
- "presuming" materials to contain asbestos unless testing confirms otherwise
- notification by building owners to employees of the presence of asbestos in their work areas prior to removal

2.2.1.4 29 CFR 1910.1001 General Industry Standard, Asbestos. Employees performing maintenance activities that are not associated with construction work, such as custodial and maintenance personnel, are covered by the general industry standard for asbestos. Building owners are required to notify employees of the presence of asbestos in their work areas.

In summary, before performing maintenance, repair, or other construction work; either test for ACM or presume building materials contain asbestos and treat them in accordance with EPA and OSHA regulations. **If a material is not wood, glass, or metal, it may contain asbestos.**

2.3 Navy Policy and Guidance:

2.3.1 OPNAVINST 5100.23E, *Navy Occupational Safety and Health (NAVOSH) Program Manual*. Chapter 17 of the OPNAVINST 5100.23E manual outlines the Navy Asbestos Management Program Ashore. Although this is the Navy's safety manual, the environmental

program and facilities requirements are also included. The program is made up of the following three critical elements:

- Survey and material evaluation/ condition assessment of accessible asbestos in buildings
- Operations & maintenance (O&M) program including in-place management, training, re-inspection, recordkeeping, etc.
- Design and abatement of hazards

The pertinent facilities management aspects of the asbestos program are:

- Actively manage undamaged ACM in place, and maintain in good condition. Repair or remove damaged ACM.
- A clearance level of 0.01 fibers per cubic centimeter in air has been established for all types of buildings to ensure that occupants are protected from exposure. (paragraph 1705)
- A chart is included that outlines the job specific training requirements of EPA, OSHA and the Navy. (Appendix 17-B)
- Unified Facilities Guide Specification (UFGS) 13281N, "Engineering Control of Asbestos Containing Materials," is required for all contracted construction work. (paragraph 1711)
- Commanding Officers are required to appoint an Asbestos Program Manager (APM), responsible for carrying out the Asbestos Management Program Ashore. The APM may be located in either the Public Works, Environmental, or OSH Departments. (paragraph 1707)
- An Asbestos Medical Surveillance Program has been established for all personnel exposed at or above the OSHA permissible exposure limit. (paragraph 1710)

The Navy program provides flexibility for each activity to determine the department in which the APM will reside. Regardless of the APM location within your command, **effective coordination among PW, Environmental, the OSH Department, and the Contracting Officer is required to ensure proper management of asbestos containing materials**.

2.3.2 Unified Facilities Guide Specification (UFGS) 13281N, "Engineering Control of Asbestos Containing Materials." This guide specification covers safety procedures and requirements for the demolition, removal, encapsulation, and disposal of ACM performed by contractors. OPNAVINST 5100.23E requires use of the guide specification for design of asbestos actions in Navy facilities. Use UFGS 13281N to ensure project designs comply with regulatory requirements.

2.3.3 COMNAVFACENGCOM ltr 11101, FAC 08T/1822B of 9 NOV 1992, Navy Family Housing Lead-Based Paint/Asbestos Inventory Program. In FY93, NAVFACENGCOM began worldwide asbestos and lead-based paint inspection of Navy family housing. The goals of the inventory were to locate asbestos containing material and lead-based paint, determine its condition, assess potential health risks to occupants, and develop techniques to reduce the cost of managing and abating asbestos and lead-based paint in housing. As a result, each activity received community specific Asbestos Management Plans and an Asbestos Activity Summary. Housing Departments maintain copies of these plans. Worldwide inspection results are maintained at Navy Public Works Center, Norfolk.

3.0 Asbestos and Facilities Management

This section relates the regulations and Navy guidance to various Public Works functions such as maintenance, repair, renovation and demolition work. An asbestos management matrix, summarizing key facility-related requirements, provisions, and actions; and a pre-work checklist are provided at the end of this section.

3.1 Maintenance Control: Compare all facilities work requests to any existing asbestos information (activity survey) where building materials will be disturbed. Evaluate other facility history and information to aid in determining the presence of ACM. An existing activity survey may reduce renovation/demolition asbestos survey costs by approximately 50-75%. Computer-Aided Drawings (CAD) and Geographical Information Systems (GIS) are a powerful tool for facilities asbestos management, project planning, estimating, and recordkeeping. Determine if or how much additional asbestos testing is needed. Where data is not available and sampling will not be performed, then presume that ACM is present. When sampling will be performed, ensure that EPA accredited personnel collect bulk samples of building materials suspected of containing asbestos.

Where asbestos has been identified, consult with the APM to determine if ACM will be disturbed, evaluate existing conditions, and any other impact, such as steam or utility interruption. Provide Planners and Estimators with any existing asbestos information to assist in developing a scope of work. Project planning and scope should include specifying removal of asbestos first (and/or in conjunction with lead paint) to allow other trades to work freely.

3.2 In-house Work -- General: "Presume" building materials contain asbestos per OSHA regulations. Implement specific work practices, personal protective equipment, and procedures where building materials have not been tested. Activity asbestos surveys provide valuable information regarding the presence of asbestos. Ensure that employees receive OSHA training where asbestos may be disturbed during maintenance or repair work. These training requirements are tiered, based on the type of work to be performed.

3.3 In-house Asbestos Work: For incidental disturbances of asbestos, the National Institute of Building Sciences (NIBS) Guidance Manual *Asbestos Operations & Maintenance Work Practices* contains standardized procedures. Activity APM's should have this manual, otherwise information to order the manual is available from the Construction Criteria Base (CCB) web site at http://www.ccb.org.

Provide asbestos removal personnel with EPA accredited training as a minimum and ensure a trained supervisor is present for large-scale removal work. Annual refresher training is required. Ensure that a trained supervisor is present for large-scale asbestos removal work.

Use specialized equipment for in-house removal work, such as; High Efficiency Particulate Air (HEPA) air filtration devices (1,000 – 2,000 feet per minute rating), HEPA filtered vacuum cleaners, and a portable shower decontamination unit. Determine additional equipment needs locally, based on the scale of asbestos removal to be performed.
Asbestos removal notifications to EPA, State or Local governments are required based on the quantities of materials to be removed. EPA annual notification may be more suited to programmed in-house asbestos removal, rather than submitting forms for every project. Consult with EPA or

States for annual notification requirements. State or local regulations have additional licensing or notification requirements that may apply.

3.4 Public Works Engineering: Asbestos is a primary concern for any project (electrical, mechanical, plumbing, etc), since there are significant impacts on the scope, design, and costs. Coordinate projects involving ACM with Maintenance Control, APM, NAVOSH, and Contracts for scope of work and design.

Architectural and Engineering (A/E) firms providing design services for local renovation or demolition work are required to either directly perform or subcontract the asbestos sampling and design portions of the project. Use the A/E Asbestos Design Guide and scope of work, Appendix A, to assure adequate testing for project design. Ensure that asbestos plans and specifications are prepared by an EPA accredited project designer. Use the Unified Facilities Guide Specification section UFGS 13281N for all asbestos work performed by private contractors. Current versions are available via the Construction Criteria Base (CCB). Since UFGS 13281N is a performance specification, the description of work paragraph is critical. Significant problems occur during construction management due to poor design description. Most large activity APM's should have the project design accreditation and may be able to assist in specification preparation for in-house design or provide contract specification reviews.

3.5 Contracts: Ensure that UFGS section 13281 is included for all asbestos removal work. Ensure that accredited project designers prepare plans and specifications and address project specific considerations, such as operational equipment during removal, non-movable objects, or occupancy of adjacent areas. The Activity APM should review contractor submittals, especially the asbestos hazard abatement plan, prior to authorizing asbestos removal.

Use UFGS 13281N as section "C" for facility service contracts (FSC) formats. Include the guide specification for larger design/build or multiple award construction contracts as appropriate. The Activity APM should review or assist in development of all in-house contracts and perform design reviews for all activity and EFD/A developed projects involving asbestos removal. Develop and implement procedures to evaluate credit card purchases, simplified acquisitions, and self-help projects that may disturb asbestos.

3.6 Estimating Project Costs: Consider asbestos cost impacts for special projects involving large-scale renovation or demolition prior to submission for major claimant approval and EFD/A's review. Existing activity surveys contain baseline information on asbestos removal costs. Include escalation and allowances for additional materials not identified in the activity survey, as project specific testing during the design phase will further characterize ACM removal requirements and develop detailed cost estimates. Include costs for compliance with applicable State and local regulations. Additional requirements may include third party monitoring, permit fees, landfill tipping fees, etc.

3.7 Funding: The funding for asbestos depends on the type of work to be performed, it's location, or condition of the material. Projects must meet specific criteria in funding categories. The applicable fund categories are:

- Real Property Maintenance / Other Base Operations Support (RPM / OBOS)
- Operations and Maintenance Navy (O & M, N)
- Military Construction (MCON)
- Hazard Abatement (HA)

- Shore Environmental Quality O & M, N

3.7.1 RPM / OBOS funds provide the source for routine maintenance and repair. Most asbestos removal or repair work conducted in the course of facilities operations should be funded by this source.

3.7.2 O & M, N funding for activity-wide asbestos surveys, development of Operations and Maintenance (O & M) plans should be submitted to the major claimant. In some instances, where state regulations have specific environmental requirements, asbestos surveys and O & M plans may be funded by the major claimant via the environmental program.

3.7.3 Military Construction, Navy (MCON). In the case of construction, asbestos removal should be part of the construction project costs.

3.7.4 Hazard Abatement (HA) funds are managed by Naval Facilities Engineering Command (NAVFAC) for abatement of NAVOSH deficiencies. The HA program focuses on the protection of people from health and safety hazards, rather than correcting deteriorated facilities. A Risk Assessment Code of "1" (RAC 1) is determined by the Activity OSH Department in accordance with OPNAVINST 5100.23E. HA funds are limited to amounts greater than $100,000 but typically less than $1 million for deficiency corrections. These funds are not available for conducting asbestos surveys or developing O & M plans. In addition, HA funds cannot to be used for asbestos removal that is required as part of a larger project. Major Claimants are directly involved in the planning and execution of HA projects. Large-scale asbestos removal projects do not typically qualify for HA program funding. Engineering Field Divisions/Activities (EFD/A's) may be able to provide some technical coordination and project design support for HA projects, which are usually programmed a year or two in advance.

3.7.5 Shore Environmental Quality O & M,N funds may be used for EPA or State required asbestos training. Obtain funding data from the Environmental Department via the Environmental Project Requirements (EPR) for Federal and State training and licensing requirements. Consult with the Environmental Department to determine if other regulated asbestos requirements qualify for environmental funding.

KEY POINTS

- Ensure workers, building occupants, and the environment are protected from asbestos hazards
- Presume building materials to contain asbestos and do not disturb, until testing shows otherwise
- Actively manage building materials, that are in good condition, in-place until maintenance, repair, construction or demolition work will disturb these materials
- Repair or replace damaged materials
- Perform asbestos sampling, project design, and removal with trained personnel
- Consult with Activity Asbestos Program Manager (APM) for technical support
- Review all contracts and projects involving renovation, demolition and/or asbestos removal
- Coordinate facilities asbestos program among Public Works, Environmental, and OSH
- Activity asbestos surveys provide baseline information for in-place management, but are not adequate for renovation or demolition
- Asbestos impacts all levels of managing and operating facilities
- Consider asbestos cost impacts when reviewing and developing projects

ASBESTOS MANAGEMENT MATRIX

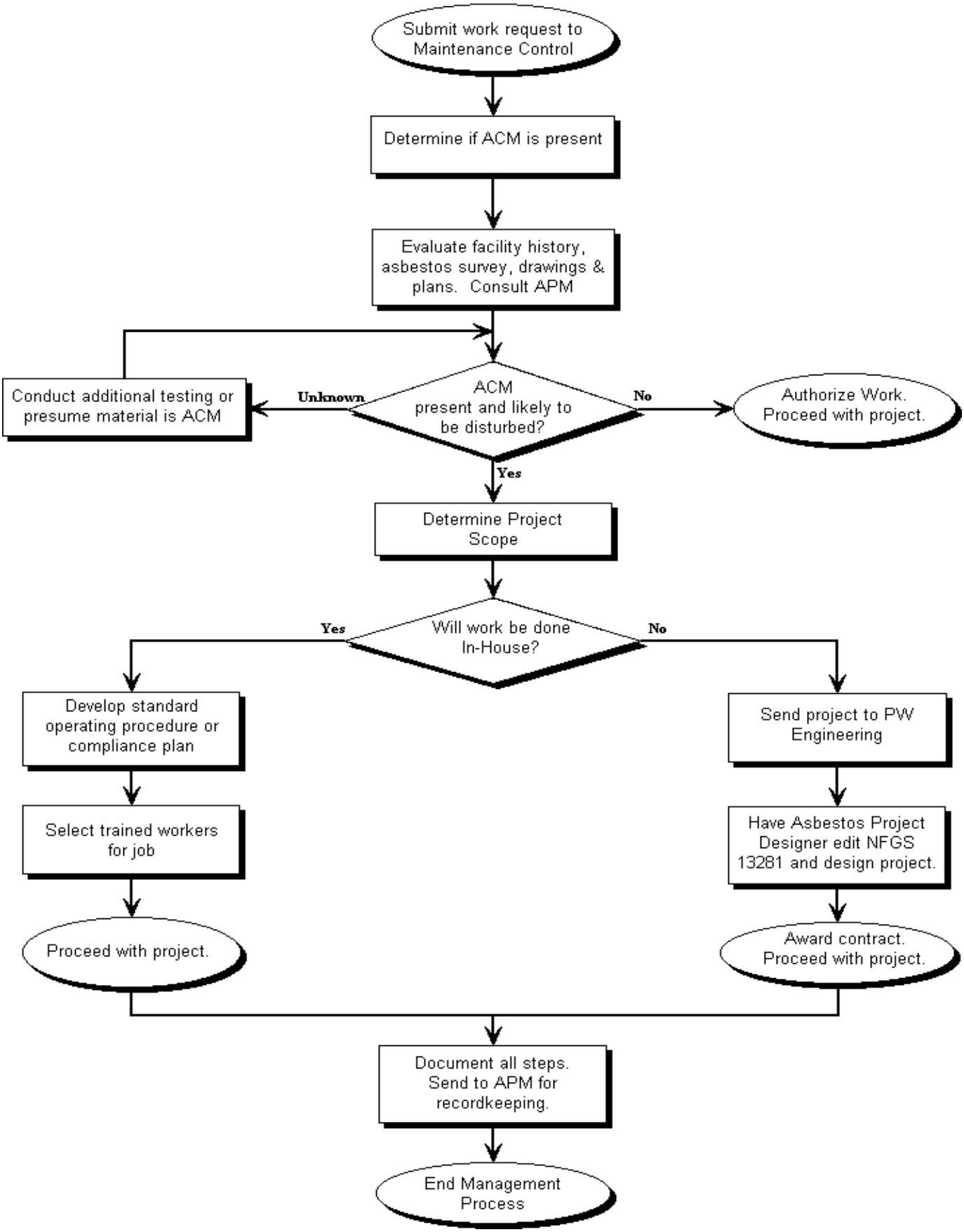
SUBJECT	REFERENCE	KEY PROVISIONS	ACTION
O & M Program	OPNAVINST 5100.23, Ch. 17 (1) NFESC SP-2027-ENV (2) EPA "Green Book" (3) 40 CFR 763 (4)	Manage and record all asbestos-related actions Train personnel Work practices Activity responsible for implementation	- Appoint Asbestos Program Manager - Test materials prior to disturbance or treat as ACM - Notify building occupants through training or by posting the building - Conduct periodic surveillance
Survey and Material Assessment (Inventory)	OPNAVINST 5100.23, Ch. 17 NFESC TM-2325-ENV (5)	Locate, identify and assess condition of ACM and PACM Train personnel Develop as part of O&M program	- Presume all suspect materials contain asbestos (unless testing proves otherwise) - Use certified Asbestos Building Inspectors - Determine degree of hazard for each suspect material - Site specific survey prior to renovation/demolition
In-house/PWC (repair and maintenance)	29 CFR 1926.1101 (6) 29 CFR 1915.1001 (7) 40 CFR 61 (8) OPNAVINST 5100.23, Ch. 17 NIBS O&M Guidance Manual (9)	Exposure assessment Engineering controls/work practices Personal protective equipment (PPE) Medical surveillance Employee training Notification	- Review work request for potential disturbance of ACM or PACM (review survey information) - Provide custodial and maintenance workers with EPA Level 2/OSHA Class III (16 hour) training - Develop SOPs or use NIBS O&M manual - Notify EPA 10 days prior to start of year if annual estimated totals will exceed specified limits
Contracts: FSC, BOS, JOC, etc. (repair and maintenance)	29 CFR 1926.1101 29 CFR 1915.1001 40 CFR 61 UFGS 13281N (10)	Exposure assessment Engineering controls/work practices PPE Trained workers Trained Project Designer to edit 13281N Notification	- Inform contractors of location of ACM - Ensure contract provisions include: use of trained personnel; testing material prior to disturbance else manage as ACM; and notify building occupants prior to disturbance - Ensure contract review by APM - Notify EPA 10 days prior to start of year if annual estimated total s will exceed specified limits
Renovation/Demolition Design	40 CFR 61 UFGS 13281N 29 CFR 1926.1101 29 CFR 1915.1001 40 CFR 763	Site specific survey prior to any renovation or demolition work EPA certified or accredited Project Designer required to edit 13281N	- Review existing survey and material assessment (inventory) - Conduct destructive testing and collect additional samples (EPA certified Building Inspector) - Ensure review of site work and design by APM, environmental, safety, and industrial hygiene
Training (Awareness)	29 CFR 1910.1001 (13) 29 CFR 1926.1101 29 CFR 1915.1001 OPNAVINST 5100.23, Ch 17	Hazard communication	- Inform building occupants, custodial and maintenance workers of presence and location of ACM at work site. - Provide custodial and maintenance workers with EPA Level 1/OSHA Class IV (2 hour) training for work in buildings with ACM

ASBESTOS MANAGEMENT MATRIX

SUBJECT	REFERENCE	KEY PROVISIONS	ACTION
Construction, Renovation, Demolition	40 CFR 61 UFGS 13281N 29 CFR 1926.1101 29 CFR 1915.1001 NFESC TM-2210-ENV (11) NFESC TM-2211-ENV (12)	EPA Notification Trained workers PPE Exposure assessment Medical surveillance Engineering controls/work practices NESHAP trained on-site supervisor ROICC project oversight, with tech support provided by A/E, EFD/EFA and activity	- Use design developed by certified Project Designer - Use specified forms (40 CFR 61) to notify EPA or State 10 days prior to starting work. - Use trained/certified EPA Level 3/OSHA Class I and II workers/supervisors - Establish restricted work areas - Adequately wet materials - Dispose in leak tight containers
Recordkeeping	29 CFR 1910.1001 29 CFR 1926.1101 29 CFR 1915.1001 OPNAVINST 5100.23	Maintain records concerning presence, location and quantity of ACM Maintain exposure monitoring records Maintain training records	- Keep building related records for the duration of ownership - For Navy personnel, keep monitoring records at least 50 years beyond last date of employment - For Navy personnel, keep training records one year beyond last day of employment
Waste Disposal	40 CFR 61	Waste labeling, collection and disposal Waste Shipment Record (WSR)	- Adequately wet waste - Dispose in leak tight containers - Coordinate WSR with Environmental

1. OPNAVINST 5100.23E: **Navy Occupational Safety and Health Program Manual**, Chapter 17 Asbestos, 31 Jan 1999
2. NFESC SP-2027-ENV: **Asbestos Control Program, Operations and Maintenance Plan**, Sept 1997
3. EPA 20T-2003: **Managing Asbestos In Place, A Building Owner's Guide to Operations and Maintenance Programs for Asbestos-Containing Materials**, July 1990
4. 40 CFR 763, Subpart E, Appendix C: **Asbestos Model Accreditation Plan,** 3 Feb 1994
5. NFESC TM-2325-ENV: **Asbestos Inspection/Reinspection Decision Tree**, Oct 1999
6. 29 CFR 1926.1101: **Asbestos in Construction Industry**, 29 June 1995
7. 29 CFR 1915.1001: **Asbestos in Shipyard Industry,** 29 June 1995.
8. 40 CFR 61, Subpart M: **National Emission Standards for Hazardous Air Pollutants; Asbestos NESHAP**, 20 Nov 1990
9. National Institute of Building Sciences: **NIBS Guidance Manual, Asbestos Operations & Maintenance Work Practices**, Second Edition, Dec 1996
10. UFGS 13281N: Unified Facilities Guide Specification, **Engineering Control of Asbestos Containing Materials**, Sept 2000
11. NFESC TM-2210-ENV, **Managing Asbestos Abatement for Demolition Contracts,** Sept 1996
12. NFESC TM-2211-ENV, **Managing Asbestos Abatement for Renovation Contracts,** Sept 1996
13. 29 CFR 1910.1001: **Asbestos General Industry,** 29 June 1995

FACILITIES ASBESTOS MANAGEMENT PROCESS



Facilities Asbestos Work Checklist

Item	Yes	No
1. Is ACM in the work area?		
2. Does the work request indicate that building materials are to be disturbed (drilled, sanded, removed, replaced, etc)?		
3. Does the Project Scope clearly identify the form, condition, quantity and location of asbestos materials to be disturbed/removed?		
4. Will the building be occupied during asbestos removal/disturbance?		
5. Has the OSH manager been notified if the building will be occupied?		
6. Have building occupants been notified prior to asbestos removal/disturbance?		
7. Do State or local regulations apply?		
In-House Work		
8. Have standard operating procedures or a compliance plan been developed?		
9. Did an accredited Project Designer develop the compliance plan?		
10. Has the APM reviewed the project plans and specifications?		
11. Has a Notification form been sent to EPA or State at least 10 days in advance?		
Contracted Work		
12. Was UFGS 13281N used to design the project?		
13. Is asbestos removal sequenced first to allow other trades to work freely?		
14. Has the APM, OSH office, and/or Environmental reviewed contractor submittals, including the safety and removal plans?		
15. Has a Notification form been sent to EPA or State at least 10 days in advance?		
16. Will the work be inspected for environmental and health/safety compliance?		

Checklist Discussion

Item 1 - Refer to written records, building plans and specifications, and asbestos inspection/ survey reports to determine if ACM is present in the work area. Obtain existing survey reports from the Asbestos Program Manager (APM). Existing data, where available, can reduce renovation/demolition asbestos survey costs by approximately 50-75%. Note, for renovation with demolition or total building demolition, destructive testing is required per 40 CFR 61 Subpart M, Asbestos NESHAP.

Item 2 - Review the work request to determine if building materials that contain (or are presumed to contain) asbestos will be or may be disturbed. Work specifically involving maintenance, repair, renovation, and demolition triggers requirements in the Asbestos NESHAP (40 CFR 61) and OSHA (29 CFR 1926.1101 and 1915.1001).

Note: If ACM is present, but not expected to be disturbed, note the presence on the work request and inform workers of the importance of not disturbing the ACM; proceed as a non-ACM project.

Item 3 - Because of the need for environmental and personnel exposure control, the Project Scope must include information on the amount, condition, and location of all asbestos materials. The accessibility, or degree of difficulty to remove the asbestos materials, should also be described in detail. Accessibility impediments may include: drop ceilings, obstruction by other objects, or scuttle ports through which personnel must enter (ex. cable work above suspended ceilings adjacent to insulated pipes). Failure to properly evaluate the scope of the project could cause extensive delays and cost overruns.

Item 4 - Determine if the building will be occupied during asbestos work. This affects the cost of asbestos removal (occupant protection and containment), and also invokes the requirement for notification of building occupants, per 29 CFR 1910.1001.

Item 5 - Notify the OSH manager in advance if the building will be occupied during asbestos removal. The OSH manager will ensure that proper procedures are implemented to protect building occupants from exposure.

Item 6 - When the building will be occupied during asbestos removal, all building occupants must be fully aware of the abatement action. The OSH manager, APM, or an industrial hygienist should conduct a seminar to properly inform personnel.

Item 7 - Ensure applicable State and local regulatory requirements are met. The air pollution control districts of many counties require a permit to remove asbestos. Additionally, many state and local governments require special licensing for contractors engaged in asbestos removal work. Legal counsel should provide a review and opinion on the applicability of these State and local regulations, per OPNAVINST 5100.23E, Chapter 17.

Determine if the work will be done by in-house personnel or by contract. If in-house proceed to item 8; if by contract, proceed to item 12.

In-House Work

Item 8 - Develop written standard operating procedures or a compliance plan, as indicated in OPNAVINST 5100.23E, Chapter 17. Basic procedures used to minimize and/or contain asbestos fibers include wet methods, mini-enclosures, and HEPA vacuums.

For repair and maintenance, standardized work practices are provided in the National Institute of Building Sciences (NIBS), *Guidance Manual: Asbestos Operations and Maintenance Work Practices.* For larger projects, the *Asbestos Abatement Guideline Detail Sheets,* EP-1110-1-11, U.S. Army Corps of Engineers, contains a series of detailed drawing sheets with instructions that identify the proper containment and controls to be employed in support of individual abatement work tasks.

Item 9 - The AHERA MAP (40 CFR 763) and OPNAVINST 5100.23E, Ch. 17, require that an accredited Project Designer develop the compliance plans for renovation/demolition projects.

Item 10 - Provide adequate time for the APM to review project plans and specifications. Where the task is not covered by previously approved standard work practices, the APM should make sure that the appropriate protective measures are used for the job.

Item 11 - NESHAP (40 CFR 61) requires written notification to the State or local air quality management district 10 working days prior to starting work. This notification is required for all demolition projects and renovation activities that breakup, dislodge, or similarly disturb ACM in amounts greater than 160 square feet, 260 linear feet, or 35 cubic feet.

An annual written notification is also required for non-scheduled routine maintenance activities (repair and maintenance) whenever the total amount of asbestos removed is likely to exceed the renovation limits for a given year. Notification is required prior to the beginning of the year. Check with the Environmental Office or APM to see if this notification has been submitted.

Contracted Work

Item 12 - Use UFGS 13281N for all contracted asbestos work per OPNAVINST 5100.23E, Chapter 17. EPA accredited Project Designer training is required to edit the specification section.

Item 13 - Specify that project schedule must require asbestos removal be performed first. Asbestos work in regulated areas requires: sealing off or shutting down of the HVAC system; shutting down of electrical power; allowing entry by only trained personnel with personal protective equipment and respirators; and informing personnel on multi-employer work sites of the nature of the work and measures taken to ensure they are not exposed to asbestos. Scheduling asbestos work first eliminates many of these considerations.

Item 14 - Submittals need technical review and approval to ensure EPA and OPNAVINST 5100.23E Chapter 17 requirements are met. Since the removal, environmental, and health/safety plan submittals become an enforceable part of the contract specifications, conduct a thorough review prior to acceptance. The plans are usually prepared prior to the pre-construction meeting. Include the APM, OSH Office, and Environmental in pre-construction conferences to evaluate the contractor's environmental and health/safety plans.

Item 15 - NESHAP (40 CFR 61) requires written notification to the State or local air quality management district 10 working days prior to start of work. This notification is required for all demolition projects and renovation activities that would breakup, dislodge, or similarly disturb ACM in amounts greater than 160 square feet, 260 linear feet, or 35 cubic feet.

Item 16 - Ensure qualified personnel inspect and evaluate contractor environmental and health/safety performance. The APM, Environmental, OSH Office, or industrial hygienist may be able to provide technical support.

4.0 Lead

4.1 Background: Lead is most commonly associated with paints, however, plumbing materials, x-ray shielding, metal roof flashing, high voltage electrical system components and other materials may contain lead. Brief acute exposures to high concentrations of lead, such as, welding, burning or dry sanding on painted surfaces with inadequate ventilation; or firing range maintenance or cleaning can result in severe exposures. Chronic exposures to low levels also have long term health effects. *It takes very little lead to create a health hazard*. The Navy has other industrial processes that may use lead (heat treating, lead smelting), which are not considered in this guide, but may affect facilities management operations. *Painted surfaces should be managed in-place and maintained in good condition.*

This section of the guide addresses the general regulations, Navy guidance and requirements for lead. Although there are numerous lead regulatory requirements, only the pertinent facility-related aspects have been included. Specifically, housing and child-occupied facilities are regulated by EPA for lead-based paint and associated hazards. Contact the Activity NAVOSH or Environmental Departments or EFD/A Safety or Environmental offices for additional clarification of regulatory requirements.

The facilities management section applies the regulations and Navy guidance / requirements to various public works functions. These functions and requirements are related and build upon each other.

A Lead Hazard Management Matrix is provided at the end of the lead section that summarizes the key facilities-related subjects, requirements, provisions and actions. A Facilities Lead Management Process provides a flow chart for following a work request through the facilities process.

4.2 General Requirements:

4.2.1 Federal Regulatory Requirements

OSHA, EPA, and the Housing & Urban Development (HUD) agency all have regulations and guidance for paint that contains lead. The OSHA General Industry and Construction Standards for lead were promulgated to protect workers from harmful lead exposures, regardless of the source or where the work is performed. More recently, the EPA and HUD finalized regulations that specifically address hazards associated with lead-based paint in pre-1978 housing and child-occupied facilities. Because lead can permanently damage the nervous system, especially during the early developmental years, the EPA and HUD regulations focus on the protection of children and occupants in their homes. The regulations of these agencies are outlined below.

NOTE:

OSHA standards apply to any detectable concentration of lead in paint - even small concentrations of lead can result in unacceptable employee exposures. By convention, paint with any detectable concentration of lead is referred to as "paint with lead" in this guide. This use of the term "paint with lead" should not be confused with the EPA and HUD regulatory definition of "lead-based paint" at 0.5wt% or 1 mg/cm^2, nor the Consumer Product Safety Commission level of 0.06wt%. OSHA cannot recognize these levels as safe, as certain work practices entail exposures above the action level even at extremely low concentrations of lead.

4.2.1.1 29 CFR 1926.62 Construction Industry Standard, Lead. The construction work covered by this standard includes any repair or renovation activities, or other activities that disturb in place lead-containing materials, paints, coatings or substrates. This does not include routine cleaning and repainting where there is insignificant damage, wear or corrosion of existing lead-containing materials or surfaces.

The standard does not specify a minimum lead concentration to indicate the presence of lead or the potential for occupational exposure; nor does it specify a minimum surface area. The standard applies if the presence of lead is detected using a valid detection method, such as ASTM Method D3335-85a "Standard Test Method for Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy," with a detection limit of 0.01wt% (100ppm). When a detectable concentration of lead is present, the OSHA standard specifies the level of protection required for workers based upon the construction related work processes (i.e., task-based triggers) or previous exposure assessments.

4.2.1.2 29 CFR 1910.1025 General Industry Standard, Lead. Employees performing maintenance activities *not* associated with construction work, such as decontamination and cleaning of a firing range, are covered by this general industry standard.

4.2.1.3 40 CFR 745, Subpart D –Lead-Based Paint Hazards. The EPA defines a lead-based paint hazard for target housing and child-occupied facilities as a paint-lead hazard, a dust-lead hazard, or a soil-lead hazard. A paint-lead hazard is *deteriorated* paint that contains greater than 0.5wt% lead (5,000 ppm), or lead-based paint on friction or chewable surfaces. A dust-lead hazard has surface lead-contaminated dust in excess of the EPA levels, 40 micrograms per square foot ($\mu g/ft^2$) for floors and 250 $\mu g/ft^2$ for interior window sills. A soil-lead hazard is bare soil play areas exceeding 400 ppm lead, or rest of the yard bare soil average exceeding 1200 ppm. Target housing and child-occupied facilities are defined in the glossary. The regulation permits one or more LBP hazards to be present and does not require corrective action by the owner of the residential property.

4.2.1.4 40 CFR 745, Subpart E –Residential Property Renovation, Information Distribution Requirements. Under Subpart E, the EPA requires persons who perform a renovation of target housing to provide a lead hazard information pamphlet to the owner and occupant no more than 60 days prior to starting work. This notification requirement also applies to repair and maintenance that disrupt more than two square feet of lead-based painted surface per component in occupied units and common areas of multi-family dwellings. Records demonstrating compliance with this subpart must be retained for 3 years following completion of the work. Records include signed and dated acknowledgments of receipt of notification, records of notification regarding work in common areas, or reports by a certified inspector that lead-based paint is not present.

4.2.1.5 40 CFR 745, Subpart L—Lead-based Paint Activities (training and work practices). This Subpart of the EPA regulations covers training, work practices, and certification requirements that pertain to target housing and child-occupied facilities. These provisions are intended to ensure that individuals conducting "lead-based paint activities" such as inspections, risk assessments, and hazard abatement, are properly trained and certified. Further, any lead-based paint activity must be performed in compliance with HUD and EPA guidance. The federal government waived sovereign immunity for certifications and fees associated with lead-based

paint activities; therefore, this regulation applies to federal employees performing inspection, assessment, design and abatement of lead-based paint hazards. Federal agencies are also required to comply with State and local requirements.

NOTE:

The regulations in 40 CFR 745 Subparts D and L apply to the evaluation and abatement of lead-based paint hazards. Rarely does the Navy conduct an "abatement" as it is defined in the regulations - the occasions being title transfer of housing built before 1960, or if a child is identified with an elevated blood lead level.

There are *proposed* federal regulations that would extend the EPA training, certification and work practice requirements to public and commercial buildings, and renovation and repair of housing. Many States have already done so.

Workers performing maintenance, repair, remodeling and renovation in target housing where lead-based paint may be disturbed need not be certified, unless the specific intent is to abate a hazard, or State regulations require licensing. However, OSHA still applies and protective work practices must be followed.

4.2.1.6 40 CFR 260-268 Hazardous Waste Management. These EPA regulations require that all solid waste, including painted components and construction debris, be characterized to determine applicable handling, storage and disposal requirements. Though the regulations cited here are federal, nearly all States are authorized to administer their own hazardous and solid waste regulatory programs. Local regulations and specific landfill requirements can further restrict disposal options for lead-based paint coated materials.

It is strongly recommended that waste determinations be made, by either analytical means or knowledge of the waste, before the project begins. This may require analysis of a number of composite samples (i.e., paint layers plus substrate) to adequately characterize the waste as a whole. Components with multiple layers of paint on relatively little substrate, such as window frames and trim, may exhibit the toxic characteristic for lead and must be managed as hazardous waste. Analyses from similar structures or components may serve as knowledge of the waste. Consult the Environmental Department for site-specific requirements.

Note, the hazardous waste generated by a demolition or renovation project could be sufficient to change the installation generator status of a Small Quantity Generator of less than 1000 kg (2200 pounds) per month, to a Large Quantity Generator of more than 1000 kg per month. This would trigger additional requirements, such as; 90-day waste accumulation time limits, additional hazardous waste training, more recordkeeping, and the contingency planning requirements of 40 CFR 262.34. A carefully planned "de-construction" approach may be warranted to segregate hazardous components, minimizing the total volume of hazardous waste generated.

4.2.1.7 *HUD Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*, June 1995 (Title X, Section 1017). These guidelines address lead hazards posed by deteriorated paint, dust, and soil in the residential environment. The guidelines provide detailed technical information on how to identify lead-based paint and related hazards in housing, and how to control such hazards safely and efficiently. The HUD Guidelines for lead-based paint activities are incorporated by reference into EPA regulations at 40 CFR 745 Subpart L, and therefore have the force of the regulation when performing LBP hazard abatement.

4.2.1.8 24 CFR 35 Notification, Evaluation and Reduction of Lead-based Paint Hazards. On September 15, 1999, HUD issued a final rule on the requirements for notification, evaluation, and reduction of lead-based paint hazards in federally owned residential property. The purpose of this rule is to ensure federally owned housing that is to be sold, does not pose lead-based paint hazards to young children. The provisions of 24 CFR 35 Subpart C are applicable to pre-1960 Navy-owned housing at title transfer, and requires; disclosure, LBP inspection / risk assessment, and abatement of lead-based paint hazards before occupancy. There is an option, however, to transfer the abatement responsibility with the property. Disposal of Navy housing constructed between 1960 and 1978 requires LBP inspection / risk assessment and disclosure of known lead-based paint and lead-based paint hazards. Similar to the EPA work practice standards, this rule includes Prohibited Methods of Paint Removal in section 24 CFR 35.140.

4.2.2 Navy Policy and Guidance

4.2.2.1 OPNAVINST 5100.23E, *NAVOSH Manual*, Chapter 21, "Lead." This instruction restricts the use of all paints to less than 0.06% lead by weight. Navy personnel are to assume painted surfaces contain lead, but are not hazardous if in good condition. Therefore, large scale testing and removal of paint is not warranted. **Painted surfaces should be managed in place and maintained in good condition.** The NAVOSH Manual also includes worker protection and ventilation system criteria to reduce exposures.

4.2.2.2 NAVFAC Message R 160647 Z APR 98 ZYB, Lead Dust Clearance Levels. To protect building occupants, a clearance level of 200 micrograms per square foot following construction work in non-industrial public and commercial buildings is recommended.

4.2.2.3 Unified Facilities Guide Specification (UFGS) 13282N, "Lead in Construction." This guide specification covers the requirements for protection of workers and disposal of lead, and provides guidelines and recommendations for cleanup where construction projects impact lead containing material and/or lead-containing paint. It does not apply to abatement of lead hazards in target housing or child-occupied facilities.

4.2.2.4 Unified Facilities Guide Specification (UFGS) 13283N, "Removal/Control and Disposal of Paint with Lead." This guide specification covers the requirements and procedures for limiting occupational and environmental exposure to lead when removing paint with lead or lead-based paint, including hazard abatement as defined by Public Law 102-550 Title X - Residential Lead-Based Paint Hazard Reduction Act of 1992. It is for the restoration of surfaces and does not apply to welding and hot work.

4.2.2.5 COMNAVFACENGCOM ltr 11101, FAC 08T/1822B of 9 NOV 1992, Navy Family Housing Lead-Based Paint/Asbestos Inventory Program. In FY93, NAVFACENGCOM began worldwide asbestos and lead-based paint inspection of Navy family housing. The goals of the inventory were to locate asbestos containing material and lead-based paint, determine its condition, assess potential health risks to occupants, and develop techniques to reduce the cost of managing and abating asbestos and lead-based paint in housing. As a result, each activity received individual community Lead-based Paint Management Plans and a Lead Activity Summary. Housing Departments maintain copies of these plans. Worldwide inspection results are maintained at Navy Public Works Center, Norfolk.

4.2.2.6 *Indoor Firing Ranges Industrial Hygiene Technical Guide*, TM6290.99-10, Navy Environmental Health Center (NEHC), December 1999. This guide provides NAVOSH technical guidance for the evaluation of potential lead hazards at indoor firing ranges. Significant lead hazards are present when cleaning or performing maintenance and repairs. Lead in dust tends to accumulate around the firing line, bullet trap, and exhaust ventilation equipment. Prior to any work, assess hazards in accordance with the guide. Use specialized maintenance and cleaning contracts or in-house work practices to perform scheduled and unscheduled repairs. In addition to this guidance, NAVFAC has established a Technical Center of Expertise for Small Arms Ranges at Atlantic Division, Naval Facilities Engineering Command, Code 15, comm. 757-322-4205.

5.0 Lead and Facilities Management

This section relates the regulations and Navy guidance to various Public Works functions such as maintenance, repair, renovation, and demolition work. The following sections may be subdivided for facilities and housing as applicable. Facilities and OSHA requirements apply to work performed in housing. However, the housing requirements do not apply to facilities work, unless they are classified as "child-occupied facilities", such as Child Development Centers.

5.1 Maintenance Control:

5.1.1 Facilities: Evaluate work requests and determine if paint with lead paint or other materials containing lead will be disturbed. Use the scope of work in Appendix A, which contains the criteria to determine the presence of lead in painted surfaces. Ensure that paint chip samples are collected from surfaces that will be disturbed by renovation, maintenance, repair, or demolition work. Assume painted surfaces contain lead for OSHA worker protection purposes where no samples are collected. Where repainting with minimal surface preparation (i.e. interior office repainting) is scheduled, the OSHA lead standard does not apply.

An X-Ray Fluorescence (XRF) meter may be used as a screening device to rapidly determine the presence of lead; however it is designed to identify LBP at the levels defined by EPA and HUD, and is not sensitive enough to determine that no lead is present to satisfy OSHA requirements. Assess the need to implement the OSHA standards when lead has been identified (greater than 0.01%).

Characterize waste stream(s) to determine whether waste is solid or hazardous prior to starting work. Appendix A, scope of work, should be used for hazardous waste determinations. Verify waste disposal requirements with the Environmental Department, as disposal requirements and costs may significantly impact the project (see Section 4.2.1.6)

5.1.2 Housing: Use the Navy Public Works Center (PWC) Norfolk worldwide survey data of LBP (and asbestos) as a baseline to review work requests. The *Lead-based Paint Management Plan* and *Lead Activity Summary* contain general information for LBP of Housing communities and units. Housing departments maintain copies of the survey. Perform additional testing as indicated in 5.1.1.

Determine whether more than 2 square feet of interior painted surfaces will be disturbed in housing units constructed before 1978. When this will occur, ensure the EPA pre-renovation information pamphlet notification process is included (see Section 4.2.1.4). Coordinate notification and recordkeeping requirements with the Housing Department.

NOTE:

Maintenance and repair work that may disturb lead requires additional precautions to ensure occupants are protected. Lead safe work practices are recommended to ensure the housing unit is clean after performing work.

5.2 In-house Work:

5.2.1 Facilities: Where in-house work disturbs painted surfaces, assume lead is present unless testing has been performed. Follow OSHA requirements, unless scheduled repainting involves minimal surface preparation. Critical concerns for shop personnel are welding, torching, burning where paint is present; soldering, sanding painted surfaces, and housekeeping work that follows renovation or manual demolition work.

Contact the NAVOSH program manager to arrange for worker exposure monitoring and work practice evaluation. Ensure that building occupants are protected from lead hazards during work in occupied buildings. NAVFAC recommends clearance dust sampling to ensure that adequate clean up is conducted for work in public and commercial buildings.

Use engineering controls, such as; HEPA filtered vacuums and power tools, portable welding exhaust systems, or paint removal systems when work will disturb lead. Do not dry sweep construction debris where lead is present, use a HEPA filtered vacuum. Use other work practice controls, such as plastic sheeting, wet methods, personal protective equipment and respirators to protect workers and building occupants.

5.2.2 Housing: Develop lead safe work practices, such as HUD Guidelines or the HUD, EPA and Centers for Disease Control (CDC) *Lead Paint Safety: A Field Guide for Painting, Home Maintenance, and Renovation Work*, for housing maintenance and repairs that will disturb painted surfaces. Ensure occupants are provided written notification in advance of maintenance and repair work that disturbs more than 2 square feet of paint.

5.3 Public Works Engineering:

5.3.1 Facilities: Coordinate design and scopes of work that disturbs painted surfaces or other materials containing lead with Maintenance Control, Contracts, NAVOSH and Environmental. Use the scope of work in Appendix A for lead sampling and hazardous waste determination. Use UFGS 13282N for lead in construction work, such as; paint removal and disturbance or materials containing lead (i.e., x-ray shielding, painted doors). Use UFGS 13283N for LBP hazard abatement in housing.

5.3.2 Housing: For maintenance, repair, or renovation work that disturbs lead-based paint in housing, an accredited Lead Project Designer is highly recommended to prepare plans and specifications. This work is not considered “abatement” and does not require EPA inspector or project designer accreditation. Use the scope of work and guide, Appendix A, to prepare plans and UFGS 13282N.

Abatement is reserved for a housing unit with LBP hazards that have contributed to a resident child under the age of 6 with an elevated blood lead level. Ensure that personnel have EPA or State project designer certification to collect samples and prepare or review plans and specifications, where LBP hazards have been identified and will be “abated”. Evaluate State regulations to determine if the EPA household hazardous waste exclusion ruling can be used for contracted or in-house construction work. Edit UFGS 13283N for LBP hazard abatement.

5.4 Contracts:

5.4.1 Facilities: Use UFGS 13282N (Lead in Construction) or UFGS 13283N (Removal/Control and Disposal of Paint with Lead) for all work that disturbs lead during construction, maintenance, repair and demolition. UFGS 13282N addresses on lead in construction requirements including paint removal or removal / demolition of components that may be painted with or contain lead. UFGS 13283N focuses on LBP hazard abatement in housing or child-occupied facilities.

UFGS 13282N and 13283N are performance specifications, which makes the description of work paragraph critical by identifying the quantity(ies) of material(s) to be removed. Use specification sections 13282N or 13283N for FSC formats as section "C". Use these sections for design/build or multiple award construction contracts as appropriate. Current versions are available on the CCB web site: http://www.ccb.org.

5.4.2 Housing: Provide advanced notification to housing occupants before work is performed that will disturb more than two square feet of a painted surface. Projects involving housing maintenance, repair, or revitalization are not considered "abatement" even when the work removes or reduces potential lead exposure to occupants. Specific training and certification requirements may not be necessary for maintenance work.

When abatement must be performed, UFGS 13283N must be edited to include EPA specific training requirements and work practices. Ensure that EPA and/or State accredited or licensed personnel are used to collect samples and prepare plans and specifications. Portions of the HUD Guidelines are also applicable, as specified in EPA regulations. State regulations may be more stringent and require licensing and training. Lead hazard abatement should not be conducted in occupied units.

Regardless of the type of work performed, require appropriate cleaning and clearance wipe sampling to protect occupants after any work that disturbs lead.

5.5 Estimating Project Costs

Include the cost of applicable OSHA and EPA work practices, management, and disposal requirements for lead-containing/lead-based paint and materials as part of the project costs for renovation or demolition. Include escalation and allowances for additional materials in project cost estimates. Additional testing will be performed during the design phase to develop detailed cost estimates and determine compliance requirements for worker protection and waste disposal.

When abatement work must be performed, include costs for independent clearance testing by a firm separate from the contractor performing the work.

5.6 Funding

The type of funding used to address facilities work involving paint with lead, materials containing lead, or LBP in housing depends on its location, the type of project, and the hazard posed. Projects must meet specific criteria for funding. Types of funding may include:

- Real Property Maintenance / Other Base Operations Support (RPM/OBOS)

- Military Construction, Navy (MCN)
- Hazard Abatement (HA)
- Shore Environmental Quality Operation and Maintenance (O&MN or O&MNR)

5.6.1 Real Property Maintenance or Other Base Operations Support (RPM/OBOS). For facilities, RPM/OBOS funds are typically used to perform maintenance, repair and small scale demolition projects, which may involve paint with lead or materials containing lead. All aspects of the project, such as sampling/identification of paint and worker protection, should be addressed using project funds.

5.6.2 Military Construction, Navy (MCON). Design and construction, where paint with lead or materials containing lead will be removed and disposed, are part of the project costs.

5.6.3 Hazard Abatement (HA). Naval Facilities Engineering Command centrally manages the Hazard Abatement (HA) funds for abatement of NAVOSH deficiencies. The HA Program focuses on the protection of personnel from health and safety hazards, rather than correcting deteriorated facilities. Installing or upgrading a paint spray booth where employees are being overexposed to lead is an example of a valid project. Removal of deteriorated paint does not qualify for HA funding, and these funds are not available for lead-based paint removal or disturbance that is required as part of a larger project.

HA funds are limited to amounts greater than $100,000 but typically less than $1 million for deficiency corrections, and must be programmed at least 6 months prior to the fiscal year of the project. Engineering Field Divisions/Activities (EFD/A's) points of contact in Appendix C may be able to provide technical coordination and support for HA projects.

5.6.4 Shore Environmental Quality Operation and Maintenance (O&MN or O&MNR). In some instances where State regulations have specific environmental requirements, lead-based paint related actions may be funded by the major claimant via the Environmental Program. Training and accreditation of federal employees performing inspections, assessment, design and abatement of lead-based hazards in target housing and child-occupied facilities may be eligible for environmental funding. Coordinate funding for federal and state training and licensing requirements with the Environmental Department.

5.6.5 Housing. Separate funds are used by the family housing, Navy (FH,N) account. Do not use environmental funds, except for required EPA or State training to support housing operations.

KEY POINTS

- It takes very little lead in air, dust, fumes or paint disturbance to create a hazard
- Special training and certification is required to perform ***housing*** related sampling, design and removal of LBP hazards
- Assume paint to contain lead and do not be disturb, until testing shows otherwise
- Manage painted surfaces in-place and maintain in good condition
- Protect workers from exposure hazards and dispose of waste properly
- OSHA and EPA regulate and define lead differently. OSHA focuses on worker exposures and EPA sets paint, dust and soil lead hazard standards for housing and Child Development Centers
- Lead impacts all aspects of facilities management
- Use appropriate resources to evaluate indoor firing range lead dust hazards
- Consider lead cost impacts when reviewing work requests or projects

LEAD HAZARD MANAGEMENT MATRIX — March 01 Revision: 2

	SUBJECT	REFERENCES	KEY PROVISIONS	ACTION
FACILITIES MANAGEMENT	**In-house/PWC**	29 CFR 1926.62 (1) OPNAVINST 5100.23E Ch. 21 (2)	Exposure assessments (task-based triggers). Engineering controls Personal protective equipment Medical surveillance. Employee training.	- Test project impacted surfaces before disturbance - Use >0.01% by weight or 100 ppm as detection limit - Train workers who disturb materials containing lead - Implement engineering, work practices and PPE. - See Waste Disposal
	Contracts (FSC, BOS/JOC, etc.)	29 CFR 1926.62 NFGS 13282 (3) NFGS 13283 (4)	Same as above. 13282-Removal Materials Containing Lead 13283- Removal Lead Paint	- Coordinate contract review with environmental and safety. - See Waste Disposal
	Design	29 CFR 1926.62 NFGS 13282 & 13283	Same as above. Waste characterization -- 40 CFR 261 (Toxicity Characterization Leachate Procedure—TCLP)	- Ensure review of site work reports and design by environmental, safety, industrial hygiene. - Determine costs, handling, storage and disposal based on site work waste characterization.
	Construction/ Demolition	29 CFR 1926.62 NFGS 13282 & 13283 NFESC TM-2285-ENV (5)	Same as above. ROICC project oversight, with tech support provided by A/E, EFD/A and activity	Same as above Actions as applicable See Waste Disposal
	Firing Ranges	29 CFR 1910.1025 (6) OPNAVINST 5100.23E Ch. 21 NEHC TM-6290.99-10 (7) MIL-HDBK-1027/3B (8)	Exposure assessment Housekeeping/cleaning Industrial ventilation requirements.	Maintain ventilation system and housekeeping per NEHC TM-6290.99-10
	BRAC Property Transfer	DoD BRAC Policy (9) 41 CFR 101-47 (10)	Environmental Baseline Survey for transfer	- Eliminate “health hazards” prior to property transfer - Notify and Negotiate w/ transferee.
	Lead Paint – OSHA considerations	29 CFR 1926.62 29 CFR 1910.1025 OPNAVINST 5100.23E Ch. 21	Identify prior to disturbance (0.01% by wt)	See fac. mgmt. Design & Construction (above)
	Lead in dust (non-lead work areas)	NAVFAC Msg R 160647Z (11) OSHA CPL 2-2.58 (12)	Applies to construction, maintenance & repair in public and commercial buildings. Excludes industrial buildings.	Clearance Maintain < 200 ug/sqft Hygiene facilities 200 µg/sqft
	Lead in soil	CERCLA (13)	Applicable to identified CERCLA sites (ONLY).	Consult with Environmental Dept. States may have additional authority.
	Training	29 CFR 1926.62	OSHA awareness for construction. Competent Person for lead worker depending on exposure and assigned duties	Follow OSHA requirements & guide specifications

LEAD HAZARD MANAGEMENT MATRIX — March 01 Revision: 2

	SUBJECT	REFERENCES	KEY PROVISIONS	ACTION
HOUSING/RESIDENTIAL	**Disclosure**	40 CFR 745 [14] Subpart F NAVFAC/BUMED ltr May 97 [15]	Disclosure to all occupants using EPA pamphlet	Navy Policy (follow EPA Subpart F)-- Housing Office provide at time of assignment
	Public Private Venture (PPV)	40 CFR 745 Subpart F	Disclosure in contract documents	Consult with Counsel for applicability and requirements
	Property Transfer	24 CFR 35 Subpart A,B, C, & R[16] DoD BRAC Policy DoD LBP Field Guide [17]	Inspect, risk assessment, & abate hazards based on construction date	Year constructed affects actions. Where intended reuse is demolition of housing-- no action required Housing reconstruction following demo requires soil testing.
	Design, Construction, Renovation, Remodel, Maintenance	40 CFR 745 Subpart D & L (or Q) NFGS 13282 & 13283 40 CFR 745 Subpart E	Trained workers, work practice standards Year constructed affects actions	PWC or contractor provides Lead Hazard pamphlet before work See Facilities Management-- In House and Design (above)
	LBP Hazard	40 CFR 745 Subpart D &L (or Q) NAVFAC ltr 11101 FAC 08T /1822B of 9 Nov 92[18]	Hazards – Deteriorated interior / exterior paint & friction surfaces, Dust , and Soil included See housing inspection program (below).	Use In-Place Management to control hazards (NAVFAC ltr) Eliminate hazards with major housing projects & funding or claimant/activity funded.
	LBP Hazard Abatement	40 CFR 745 Subpart D, E, L (or Q) NFGS 13282 & 13283	Work practice standards for inspection, risk assessment and abatement of hazards Defines LBP hazards (Paint, Dust, & Soil) Clearance requirements, Specific training, possible State program compliance	Required for child with elevated blood lead or property transfer. Requires proper training & certification for all work practices See Facilities Mgmt—In House, Contracts, Design (above)
	Dust Lead Hazard	40 CFR 745 Subpart D	Impacts housing transfers or Child with Elevated Blood Level (EBL) Sets hazard and clearance levels.	Abate Hazards for transfer or Child with EBL. Use In-Place Management to control hazards (NAVFAC ltr)
	Soil Lead Hazard	40 CFR 745 Subpart D DoD BRAC policy	Impacts housing transfers or Child w/ EBL. Sets hazard and clearance levels for active and BRAC sites. CERCLA does NOT apply if not a National Priorities List (NPL) site.	Abate Hazards for transfer or child with EBL. Use In-Place Management to control hazards (NAVFAC ltr)
	Training	40 CFR 745 Subpart L (or Q)	Applies to Residential/Child Occupied facilities. EPA requirement effective 3/1/00.	Required only for LBP Hazard Abatement. Not required for housing construction
	Navy Family Housing Inspection Program	NAVFAC ltr 11101 FAC 08T /1822B	Locate LBP/Asbestos in family housing and determine its condition Assess LBP/Asbestos health risks	Housing Inventory complete Management plans submitted Follow-up by local PWC, Housing manager, MTF
Child Occupied (Child care, Community Center)		40 CFR 745 Subpart F DoD LBP Field Guide	Refer to housing requirements. BRAC transfer-if same reuse follow housing requirements.	Follow housing requirements.
Child Elevated Blood Lead		BUMED 6200.14 [19]	Coordinate w/ BUMED, activity team of housing, PREVMED, IH, facilities.	Additional support EFD/A, PWC, NEHC

LEAD HAZARD MANAGEMENT MATRIX — March 01 Revision: 2

SUBJECT	REFERENCES	KEY PROVISIONS	ACTION
Waste Disposal	40 CFR 260-270 [20]	Current testing of demo debris required. May relax certain disposal requirements	Possible cost reductions construction debris

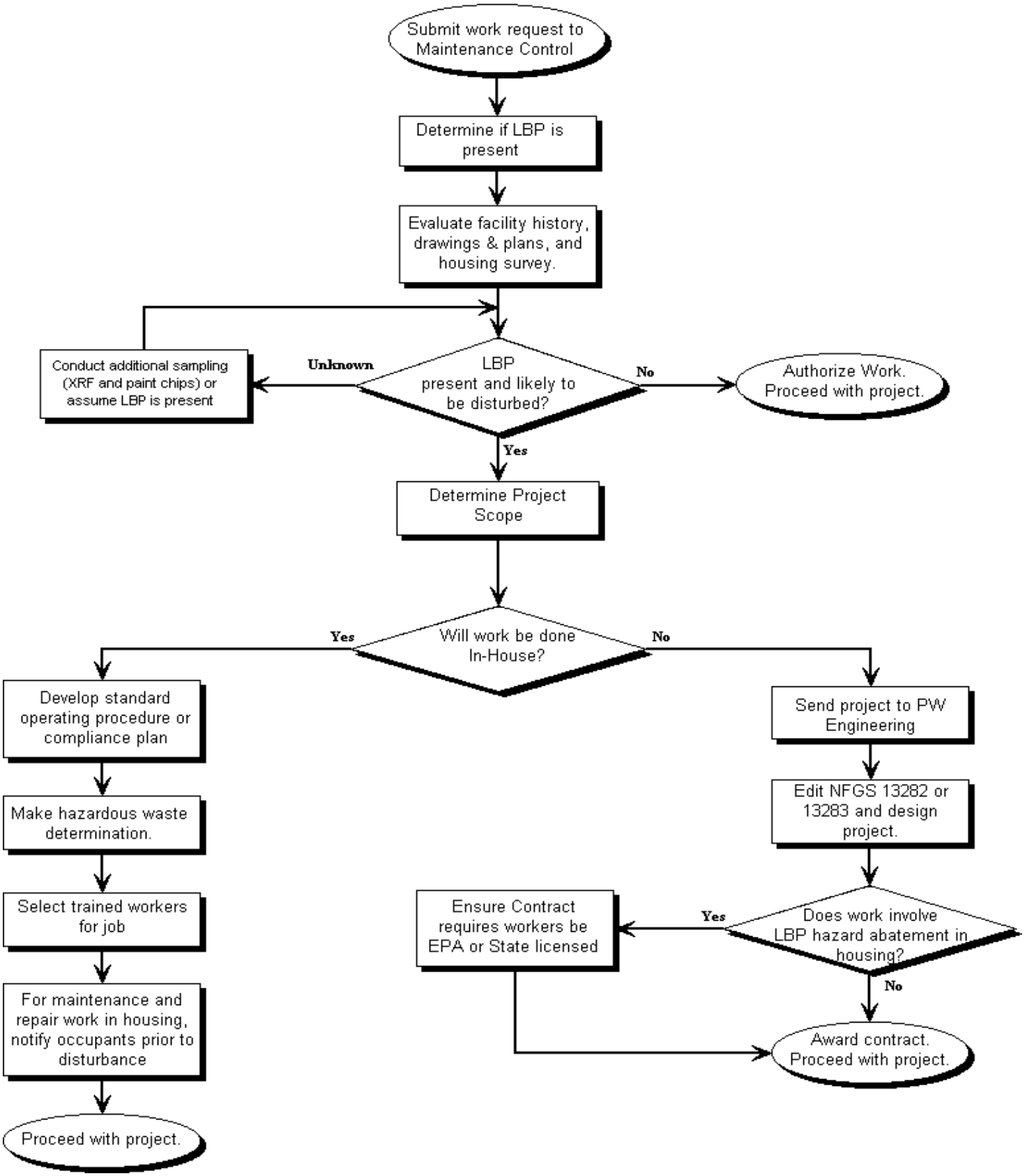
The lead hazard management matrix summarizes the issues, regulations, references, key provisions and actions. Additional requirements are in the references:

1. 29 CFR 1926.62: **Lead in Construction** – Federal Register (FR) 3 May 93
2. OPNAVINST 5100.23E, Chapter 21: **Navy Occupational Safety and Health Program Manual** --31 Jan 99.
3. NFGS 13282A: NAVFAC Guide Specification, **Removal and Disposal of Lead Containing Material,** 30 Sep 99.
4. NFGS 13283C: NAVFAC Guide Specification, **Removal and Disposal of Lead-Containing Paint,** 30 Sep 99.
5. NFESC TM-2285-ENV, **Lead Paint Removal QA Manual for Renovation/Demolition Contracts at Non-Housing/Non-Child Occupied Facilities,** Aug 98
6. 29 CFR 1910.1025: **Lead General Industry** --FR 11 Oct 95
7. NEHC TM-6290.99-10: **Indoor Firing Ranges Industrial Hygiene Technical Guide** -- Dec 99
8. MIL-HDBK-1027/3B: **Range Facilities and Miscellaneous Training Facilities Other Than Buildings** -- Notice 1, 30 Jun 95
9. DoD BRAC Policy: **Asbestos, Lead Paint, and Radon Policies at BRAC Properties** -- Office of the Under Secretary of Defense letter of 31 Oct 94
10. 41 CFR 101-47: **Utilization and Disposal of Real Property,** revised 01 July 00
11. NAVFAC Msg R 160647Z: **Lead Dust Clearance Levels,** April 1998
12. OSHA Std Compliance Directive: CPL 2-2.58: **Inspection Compliance Procedures,** 13 Dec 93
13. 42 U.S.C. s/s 9601 et. seq. (1980) **Comprehensive Environmental Response Cost and Liability Act (CERCLA or Superfund)**
14. 24 CFR 35: **Lead Based Paint Poisoning Prevention in Certain Residential Structures**, FR 15 Sep 99
- Subpart A -- Disclosure of Known Lead-Based Paint Hazards Upon Sale or Lease of Residential Property
- Subpart B -- General Lead-Based Paint Requirements and Definitions for All Programs
- Subpart C -- Disposition of Residential Property Owned by a Federal Agency Other Than HUD
- Subpart R -- Methods and Standards for Lead-Based Paint Hazard Evaluation and Hazard Reduction Activities

15. NAVFAC/BUMED joint letter, **Lead-Based Paint Assessment Program Disclosure Program for Navy Family Housing**, 29 May 97.
16. 40 CFR 745, **Lead-Based Paint Poisoning Prevention in Certain Residential Structures,** FR 01 June 98
- Subpart D, Lead-Based Paint Hazards, FR 05 Jan 01
- Subpart E, Hazard Education Before Renovation of Target Housing FR 01 June 98.
- Subpart F, Disclosure of Known Lead-Based Paint and/or Lead-Based Paint Hazards Upon Sale or Lease of Residential Property, FR 29Feb 96
- Subpart L, Lead-Based Paint Activities, FR 29 Aug 96. Amendment - Date Extension for Training to Mar 2000, FR 6 Aug 99
- Subpart Q, State and Indian Tribal Programs

17. **Lead-Based Paint Guidelines for Disposal of Department of Defense Residential Real Property - A Field Guide**, Dec 99.
18. COMNAVFACENGCOM ltr 1101 FAC 08T/1822B, **Navy Family Housing Lead Based Paint/Asbestos Inventory Program**, 9 Nov 1992
19. BUMEDINST 6200.14, **Pediatric Lead Poison Prevention Program (PLPP) Screening Plan**, 06 July 94
20. 40 CFR 260 thru 270: Hazard Waste Regulations on Management, Identification, Generation, Transportation, Disposal, and Permitting.
OSHA: Lead Present 0.01% or 100 ppm **NAVFAC Dust Clearance:** less than 200 ug/ft^2 for non-industrial public/commercial buildings (NAVFAC Msg)
EPA: LBP 0.5% (5,000 ppm) or 1.0 mg/cm^2
-**Paint Lead Hazard:** Friction surface w/Dust hazard, damaged impact surface, chewable surface w/teeth marks, or deteriorated interior/exterior paint
-**Dust Lead Hazard:** equal to or more than 40 ug/ft^2 on floors or equal to or more than 250 ug/ft^2 on interior window sills
-**Soil Lead Hazard:** equal to or more than 400 ppm in bare soil for child play areas or equal to or greater than 1,200 ppm bare soil in other yard areas

FACILITIES LEAD-BASED PAINT MANAGEMENT PROCESS



Facilities Lead Work Checklist

Item	Yes	No
1. Is lead-based / lead-containing paint or material present in the work area?		
2. Does the work request indicate that lead paint or materials will be disturbed (drilled, sanded, etc.) or involve maintenance, repair, renovation or demolition?		
3. Does the Project Scope clearly identify the quantity and location of lead-based / lead-containing paint or material to be disturbed/removed?		
4. Do state or local regulations apply?		
5. Has a hazardous waste characterization been done to determine disposal requirements?		
In-House Work		
6. Have standard operating procedures or a compliance plan been developed?		
7. Has the lead removal been sequenced first to allow other trades to work freely?		
8. Will the building be occupied during lead removal/disturbance?		
9. For work in occupied housing units, have occupants been notified prior to removal/disturbance of lead-based paint?		
Contracted Work		
10. Was Unified Facilities Guide Specification Section 13282N or 13283N used to design the project?		
11. Have pre-construction environmental and health & safety submittals been reviewed by Envir & OSH departments prior to acceptance?		
12. Has the lead removal been sequenced first to allow other trades to work freely?		
13. Will the building be occupied during lead removal/disturbance?		
14. For work in occupied housing units, have occupants been notified prior to removal/disturbance of lead-based paint?		
15. Will the work be inspected for environmental and health/safety compliance?		

Checklist Discussion

Item 1 - Identification of lead-based/lead-containing paint, and materials containing lead is essential in developing the project scope and ensuring workers are not over exposed. Lead-containing paint is commonly found in older buildings, fuel piping, and steel structures, and on every type of surface that can be painted or coated. The OSHA standard applies when lead is detected using a valid detection method (detection limit of valid method is usually 0.01wt%).

Note: This level of 0.01wt% is less than the Consumer Product Safety Commission (CPSC) 0.06wt% definition of lead-containing paint; therefore, lead should be expected in any paint, regardless of age.

Refer to written records, building plans and specifications, and any lead-based paint inspection/survey reports. For Housing projects, contact the Housing Department for a copy of the *Lead-based Paint Management Plan*. Conduct additional sampling where limited data exists. Use the scope of work in Appendix A for lead-paint sampling.

Item 2 - Review the work request to determine the type of work and if building materials will be disturbed. Work specifically involving maintenance, repair, renovation, and demolition triggers requirements in OSHA (29 CFR 1910.1025 or 29 CFR 1926.62).

Item 3 - Because of the need for environmental and personnel exposure control, the Project Scope needs to include information on the amounts, the condition, and locations of all lead-containing materials and the degree of removal difficulty. The accessibility of the materials should be described in detail. Accessibility impediments may include drop ceilings or other obstructions. Failure to properly evaluate the scope of the project could cause extensive delays and cost overruns.

Item 4 - Ensure applicable State or Local regulatory requirements are met. State regulations may apply for certain types of residential work or exterior building repainting. If the project is to abate a hazard due to elevated blood lead in a child, EPA and state or local regulations will apply. Presently, lead-based paint hazard abatement in target housing requires EPA accredited training, at a minimum.

Item 5 - Prior to the start of work, perform toxic characteristic leachate procedure (TCLP) testing for lead on non recyclable or otherwise solid/hazardous waste to determine requirements for handling, storage, and disposal. Additional waste characterization may be necessary during the course of work in accordance with 40 CFR 261. If work is contracted, it is the responsibility of the contractor to make this determination.

Determine whether the work will be done by in-house personnel or by contract. If in-house personnel will perform the work, proceed to checklist item 6; if contracted go to item 10.

In-House Work

Item 6 - Develop written standard operating procedures (SOP) or compliance plans, as indicated in OPNAVINST 5100.23E, Chapter 21. Basic procedures used to minimize and/or contain lead include wet methods, mini-enclosures, and HEPA vacuums.

For repair and maintenance, standardized work practices are provided in the National Institute of Building Sciences (NIBS) guide *Lead-Based Paint: Operations & Maintenance Work Practices Manual for Homes and Buildings*. The OSH or Environmental department may also have developed appropriate lead work practices.

Item 7 - Specify that project schedule must require lead removal work be performed first. This will permit other trades to work without specialized training or personal protective equipment and respirators. Where asbestos is also to be removed, perform lead work first.

Item 8 - Determine if the building will be occupied during lead work. This affects the cost of the lead removal (occupant protection and containment). Notify the OSH manager in advance if the building will be occupied during lead removal.

Item 9 - Notify housing occupants, per 40 CFR 745, Subpart E, in advance of work.

Contracted Work

Item 10 - Use UFGS 13282N for projects that impact materials containing lead (building components, x-ray shielding, etc) or painted component; and UFGS 13283N to remove paint from surfaces (water tower, gusset plates prior to welding, etc).

> **Note:** For projects involving housing, it is strongly recommended that a certified project designer (per 40 CFR 745) prepare the specification. Certification as a project designer is mandatory for projects to *abate* lead-based paint hazards in housing.

Item 11 - All contractor submittals need technical review and approval to ensure EPA requirements are met. Since the environmental and health/safety plan submittals become an enforceable part of the contract, conduct a thorough review prior to acceptance. The plans are usually prepared prior to the pre-construction meeting; include the OSH and Environmental Office in pre-construction conferences to evaluate the contractor's environmental and health/safety plans.

Item 12 - Specify that project schedule must require lead removal work be performed first. This will permit other trades to work without specialized training or personal protective equipment and respirators.

Item 13 - Determine if the building will be occupied during lead work. This affects the cost of the lead removal (occupant protection and containment). Notify the OSH manager in advance if the building will be occupied during lead removal.

Item 14 - Notify housing occupants, per 40 CFR 745 Subpart E, in advance of work.

Item 15 - Ensure qualified personnel inspect and evaluate contractor environmental and health/safety performance. The Environmental Office, OSH Office or Industrial Hygienist may be able to provide technical support. OSH and Industrial Hygiene personnel act only in an advisory capacity per OPNAVINST 5100.23E requirements. Additional guidance on reviewing submittals and conducting oversight of contractor work is contained in NFESC TM-2285-ENV *Lead Paint Removal Quality Assurance Manual for Renovation/Demolition Contracts at Non-Housing/Non-Child Occupied Facilities*. A copy of the document can be obtained at http://enviro.nfesc.navy.mil/esc425/LdPub.htm.

APPENDIX A

Asbestos Design Guide for A/E's

1.0 Introduction

This Asbestos Design Guide defines the environmental services and submittal requirements for architects and engineers (A&E) performing asbestos design services for NAVFAC. A scope of work will be provided with the design Appendix A for the project. Ensure coordination of project specific information when subcontracted environmental or industrial hygiene services will be used. Provide subcontractors with a project description and copy of this guide to ensure that appropriate testing is performed to support the project.

1.1 Communications

Direct communication with the NAVFAC environmental reviewer is encouraged. If you have a question concerning a particular comment, contact your NAVFAC reviewer. This may avoid unnecessary re-submittal of plans and specifications due to a misunderstood comment. The project Design Manager is the central point of contact and the environmental reviewer's name, phone number, or email address may appear on comment sheets. Ensure the Design Manager is updated on follow up comments and responses that may impact the project.

1.2 Background

Asbestos-containing materials (ACM) are commonly found in older building materials and related products. Federal regulations require a facility asbestos survey prior to any renovation, alteration, and repair or demolition project that will disturb building materials. Comply with all safety and environmental regulations during sample collection and field investigations. Take precautions to protect human health and the environment as required by federal, state and local regulations. Data from previous asbestos surveys may be available at the activity. Earlier surveys may not have included all suspect ACM that will be impacted by the project. Use available data to help determine the scope for the project. Obtain previous data from the activity asbestos program manager (APM) or designated representative.

2.0 Asbestos Design Requirements

2.1 Asbestos

Identifying all the asbestos-containing materials that will be disturbed during a demolition/renovation is critical. The designer must determine all activities that will be required during the construction phase. The asbestos survey and construction documents must identify all areas where asbestos will be disturbed and the protocol for the contractor to protect workers and the environment during all construction activities. The designer, preparing the specification and drawings, must have current accreditation as an Asbestos Project Designer by EPA or more stringent State or Local asbestos regulatory requirements.

3.0 Pre-Design Services

3.1 Field Investigation (Site Work)

3.1.1 Asbestos Testing

Survey and sample collection shall be project specific and applicable to all suspect materials, including those previously sampled or identified. Perform a thorough; project specific survey and evaluation during the site investigation phase. This may include roofing materials, crawl space soils, and confined utility chases. Identify ACM, for renovation projects, as required by the OSHA asbestos construction standard (such as, separation of joint compound from wallboard). For renovation projects that include demolition or demolition specific projects, ensure that destructive testing is performed and identification of ACM includes EPA requirements (such as, analyzing joint compound

and wallboard as a composite). Notify the Activity Asbestos Program Manager (APM) or designated representative prior to conducting site work.

Ensure that personnel who perform ACM sampling are currently EPA-accredited or State/Locally licensed (as required), building inspectors. Provide copies of accreditation and applicable licenses with the Asbestos Report.

Laboratories performing analysis for asbestos in bulk materials shall be accredited by the National Institute of Standards and Technology/National Voluntary Laboratory Accreditation Program (NIST/NVLAP), American Industrial Hygiene Association, and shall be a successful participant and maintain proficiency in the NIST/NVLAP sponsored quality assurance program for asbestos identification. Provide copies of laboratory certification and state/local accreditation certificates with the Asbestos Report. Include copies of all certificates of analyses or test reports with the Asbestos Report.

4.0 Design Services

4.1 Environmental Basis of Design

The Environmental Section of the Basis of Design shall address all issues that will affect the demolition/renovation/construction project. This section shall include subheadings for all environmental areas that might apply, i.e. Asbestos, Lead Containing Paint/Materials, PCBs, Mercury-containing lamps, Contaminated Soil and Groundwater, or Tank Removal.

Asbestos: Indicate the presence or absence of asbestos. If present and will be disturbed, provide a description and rationale for removal. If non-friable materials are present, in good condition and will not be disturbed by the project, indicate the location, quantity and description of these materials and provide rationale for in-place management versus removal (i.e., leaving floor tile and mastic in-place and covering with carpet). Research State or Local regulations to determine if and independent (Third party) monitoring firm must be retained by the Navy and identify asbestos removal final clearance requirements. Indicate disposal requirements and appropriate regulatory requirements.

5.0 Environmental Report

An Environmental Report shall be attached to the basis of design and include the following information (as required by the scope of work.)

5.1 Asbestos Section which:

a) Provides a narrative summary of the site work that identifies the project description, location, previous survey data, additional asbestos identified. List the areas, types, and location of ACM and any contamination that will impact the project.

b) Identifies conditions that affect access or egress for workers and equipment, such as, confined spaces, crawl spaces or elevated working surfaces. Identifies utility systems (HVAC, steam, electrical, etc) which may require shutdown during the project. Note: Where the building is to remain partially occupied by the Government during construction, specifically identify these utility shutdowns to the project manager, in writing.

c) Summarizes state or local laws that affect asbestos removal and disposal for the project, such as project size, limitations on removal methods and air monitoring requirements. Also Include notification requirements, permit fees, licensing, independent Third party monitoring, or other specialized requirements.

d) Includes copies of all accreditation certificates, licenses, certificates, sampling plans, and analyses and test reports identified above.

5.1.2 "Other" Testing Section which:

a) Describes the tests performed including site history and analytical methods. Results of testing to characterize soils.

b) Summarizes state or local laws that affect removal of soil, and disposal requirements for the project. State limitations on removal methods and monitoring requirements. Includes notification requirements, permit fees, licensing or other specialized requirements.

5.2 Environmental Calculations

Provide calculations as part of the Environmental Report. Calculations for environmental work include:

a) Relative volume calculations for total waste stream categorization when providing representative amounts of building components for disposal.

b) Quantities of contaminated soil when unit pricing must be used (typical for all work with contaminated soil when the *exact* quantities are unknown.) When contaminated soil exists at the site, the designer must provide an initial estimate of the anticipated quantity of these items. The calculations shall include all assumptions made in determining the final estimated quantities.

6.0 Drawings, Specifications and Construction Estimate

6.1 Environmental Drawings and Specifications

All environmental drawings will be labeled as specified. These drawings will be placed before the Civil Drawings in a drawing set. These drawings will indicate all "environmental" type work that must be done on the project. These construction activities include:

Asbestos Removal Activities
Asbestos Removal Drawings and Specifications
Contaminated Soil (May be shown on the Civil Demolition sheets with extent of contamination delineated and appropriate notes.)

6.1.1 Asbestos Drawings and Specification

Provide scaled and dimensioned drawings and floor plans or building sections showing all ACM. (NOTE: Quantification by use of a schedule indicating ft^2 or ft^3 on the drawings or in the specifications is not a substitute for scaled and dimensioned drawings. Scaled and dimensioned drawings are the only acceptable means to quantify asbestos by showing the location and full extent of work.) All existing asbestos determined from the field survey must be indicated on the drawings by a chart or some other method to display the laboratory results of the asbestos analysis. If asbestos is present and will not be disturbed by the project, provide a drawing note indicating the type and location of the ACM, with a note that the material is not to be disturbed by project work. For ACM impacted by the project, indicate location, condition, and form of all ACM to be removed as well as structures, utilities and equipment that hinder access or egress. Provide dimensions for access or egress to crawl spaces, attics, chases or restrictive areas that affect asbestos removal personnel or equipment. Identify rooms by name and number. If ceiling tiles or panels are ACM, provide reflected ceiling plans showing grid size and layout. Indicate all diffusers, registers/grilles, light fixtures, and other ceiling mounted equipment and specify new ceiling system. Indicate all valves, gauges or other equipment associated with boiler or piping systems insulated with ACM and all dimensions or changes in duct or pipe elevations. Indicate

approximate size and description of equipment and tanks. Identify utility services, such as steam, water or HVAC that will require system shutdowns during construction. Address the provision of temporary utility service where required.

Determine all air sampling requirements and whether independent (Third party) monitoring is required. The Third party monitor is identified as the Navy Consultant (NC) and the contractor hired person as the Private Qualified Person (PQP). Edit Specification Section 13281, "Removal and Disposal of Asbestos-Containing Materials." An accredited EPA (or State/Locally Licensed) Asbestos Project Designer must prepare asbestos drawings and the specification.

6.1.2 Minimal Disturbance of Asbestos

Provide a drawing for projects where there will be a minimal disturbance of ACM during construction. Projects involving minimal disturbance of asbestos (i.e., fastening, drilling or anchoring into intact floor tile) require drawing notes only. The drawing note shall require the contractor to provide specific information regarding asbestos control measures that include worker protection, building occupant protection and environmental protection. All existing ACM determined from the field survey must be indicated on the drawings by a chart or some other method to display the laboratory results of the asbestos analysis. Where a minimal disturbance of asbestos will occur, include Specification Section 01525 "Safety Requirements". The drawing note will also reference this Specification Section. Therefore, Specification section 13281 would not apply.

6.1.3 Contaminated Soil

Provide separate Environmental drawings or use civil drawings that indicate the extent of known or suspected soil contamination. Indicate the type and level of contamination and refer to the appropriate specification for instructions on how to handle the contamination.

6.2 Construction Estimate

Include specific data in the construction cost estimate for labor, equipment, and material, insurance, overhead and profit, permit fees, air monitoring, and disposal costs. Cost estimates should include all specialized equipment and materials the contractor may need to perform asbestos removal, such as scaffolding, lifts, or self-contained HEPA vacuum systems. Provide as a separate item, an estimate for independent Third party monitoring as required by State or Local regulations.

7.0 Design Submittals

7.1 35% Design Development Submittal

- **Basis of Design-Environmental Contents**
  Provide information as discussed in Sections 2 through 4 above

- **Environmental Report and Calculations**
  Provide the report and calculations as discussed in Section 5 above

- **Drawings, Specifications, and Cost Estimate**
  Drawings shall indicate preliminary location of any environmental areas of concern. At least one Environmental drawing shall be started to show the layout of the work. Provide an index of technical specification sections that will be developed. Provide the construction cost estimate identifying specific cost items.

7.2 100% Prefinal Submittal

Revised Environmental Report and Calculations

A revised environmental report shall be prepared based on comments from the 35% submittal, if applicable. Final calculations for all environmental work shall be submitted

Drawings, Specifications, and Cost Estimate

Drawings shall indicate locations of all ACM. All existing ACM determined from the field survey must be indicated on the drawings by a chart or some other method to display the laboratory results of the asbestos analysis. Edit the appropriate Specification Section and provide cross-reference to the drawing. Provide a revised construction cost estimate as necessary, based on project changes and comments.

7.3 Final Submittal

Final Environmental Report and Calculations

The final environmental report and calculations shall be included with the project specifications.

Drawings, Specifications, and Cost Estimate

The final Environmental drawings must be stamped by a registered architect or engineer. An accredited Asbestos Project Designer appropriately licensed in the State where the work is to be accomplished must sign the appropriate drawings. Provide responses and corrections to prior comments. Provide final construction cost estimate.

8.0 Specialized Requirements

8.1 State and Local Regulations

State or Local regulations regarding asbestos may require specific licensing, testing, notification, work practice and engineering controls, Third party monitoring, clearance inspection and sampling, or specialized disposal. The designer must research the applicable provisions of these requirements as they relate to the project.

8.2 Overseas Final Governing Standards (FGS)

The Final Governing Standards may provide supplemental information on the standards to be used for Navy designs at activities in an overseas location. The A&E shall comply with all requirements of the FGS for the country/host nation where the Activity is located. An EPA accredited (or State/Local) Asbestos Project Designer must prepare all asbestos drawings and specifications. If the country has no designer certification requirements then the certification must be from the United States. If the country has designer certification requirements then the asbestos designer must possess that certification and provide their name on the drawings and specification.

9.0 Post Construction Award Services (PCAS)

Independent technical construction support, full or part-time Third party monitoring, or clearance testing services may be requested through PCAS. These services generally include providing trained and licensed personnel to perform consultation, inspection, air monitoring and independent clearance or other testing during construction. Personnel providing these services shall comply with State/Local regulations and maintain applicable licenses or registrations. A separate scope of work will be provided for Third party monitoring, where required.

Lead Design Guide for A/E's

1.0 Introduction

This Lead Design Guide defines the environmental services and submittal requirements for architects and engineers (A&E) performing lead design services for NAVFAC. A scope of work will be provided with the design Appendix A for the project. Ensure coordination of project specific information when subcontracted environmental or industrial hygiene services will be used. Provide subcontractors with a project description and copy of this guide to ensure that appropriate testing and design services are performed to support the project.

1.1 Communications

Direct communication with the NAVFAC environmental reviewer is encouraged. If you have a question concerning a particular comment, contact your NAVFAC reviewer. This may avoid unnecessary re-submittal of plans and specifications due to a misunderstood comment. The project Design Manager is the central point of contact and the environmental reviewer's name, phone number, or email address may appear on comment sheets. Ensure the Design Manager is updated on follow up comments and responses that may impact the project.

1.2 Background

Lead has historically been identified as a poison. Lead was used extensively in household paints until 1978. Currently, the Consumer Product Safety Commission (CPSC) requires all paint to contain less than 0.06% lead. Lead was also used extensively as solder for plumbing pipes until 1986. Lead is also sometimes encountered in specialty situations such as medical (x-ray) protection, firing ranges, or roof flashing. All of these factors represent facility concerns for lead during demolition and renovation.

Paint with lead is the primary factor to consider during demolition and renovation. The Occupational Safety and Health Administration (OSHA) regulates worker exposures during construction work. OSHA did not specify a concentration of lead in paint, but considers any level of lead as determined by a valid test method as triggering the requirements. For construction purposes, the Navy uses 0.01% as the detection limit. The Environmental Protection Agency (EPA) and Housing and Urban Development (HUD) define Lead Based Paint (LBP) as 0.5% by weight for residential hazard evaluation purposes.

2.0 Lead Design Requirements

2.1 Paint with Lead

Identifying all the lead issues associated with a demolition/renovation project is critical. The designer must, at the earliest stage, determine all activities that will be required during the construction of the project. The sampling plan and construction documents must clearly identify all the areas of paint with lead and the protocol for the contractor to provide protection of workers and the environment during all construction activities. NAVFAC recommends a dust clearance level of 200 micrograms per square foot for demolition/renovation projects in commercial buildings where re-occupancy will occur. Housing demolition/renovation projects are not classified as lead-based paint abatement. There are two situations that require abatement, which are: (1) hazard elimination due to a lead poisoned child or (2) the residential property is being transferred.

Paint with lead is commonly found in older buildings, fuel piping, and steel structures and on every type of surface that can be painted or coated. OSHA defines paint as containing lead for construction projects if any levels are present as determined by a valid test method. The Navy uses 0.01% as the detection limit. **Note: This level is less than the CPSC current definition of lead-containing paint; therefore, lead should be expected in any paint, regardless of age**. When demolishing materials that have paint with lead there are potential

hazards associated with the generation of lead dust. There are four different scenarios when making a determination with regard to lead hazards associated with a project. Each scenario must address three aspects: worker protection, protection of surrounding areas, and disposal requirements.

- ***Scenario No. 1***: Demolition of an entire building. In this case, the designer must make provisions for worker protection during the demolition activities and the disposal of the demolition debris will be handled as non-hazardous waste.
- ***Scenario No. 2***: Interior or Exterior Renovation of portions of an existing building where painted materials are to be removed or renovated (i.e. windows, doors, walls, molding, ceilings, pipes, etc.) In this case, the designer must make provisions for worker protection, ensure renovation activities won't expose personnel in surrounding areas to lead levels above the Action Level of 30 $\mu g/m^3$ (This is an OSHA 8 hour time weighted average (TWA) measurement) and determine, during the design phase, the characterization of the wastestream for disposal purposes. The wastestream characterization will determine whether the waste is disposed of as hazardous or non-hazardous waste.
- ***Scenario No. 3***: Removal of paint with lead from a substrate. In this case the designer must make provisions for worker protection and disposal of the paint waste as hazardous waste.
- ***Scenario No. 4***: Installation of new work that would require minor demolition of surfaces that have paint with lead. Examples of this type of work include cutting holes in walls to install new electrical wires or mechanical piping; nailing of new items to existing surfaces; cutting out portions of painted piping; and welding to existing steel structures that have paint with lead. In this case the designer must either; 1) provide for worker protection, or 2) ensure activities won't expose personnel in surrounding areas to lead levels above the Action Level of 30 $\mu g/m^3$, and provide for disposal of any residue that might be collected from dust filters or vacuum filters. (Note provisions for minimal disturbance of paint with lead in paragraph 6.1.3).

2.2 Materials Containing Lead

The demolition of materials containing lead will be the same as ***Scenario No. 2*** above. Lead containing materials would include items such as plumbing fixtures, flashing, and medical (x-ray) protection.

3.0 Pre-Design Services

3.1 Field Investigation (Site Work)

3.1.1 Lead Paint Testing

Evaluate all painted surfaces that will be impacted by the project for lead. Areas to survey include all painted structures and surfaces, coatings on steel structures and fuel lines. If an X-ray Fluorescence (XRF) instrument is used for screening, classify the results as positive, inconclusive or negative according to the EPA Performance Characteristics Sheet for the instrument. An XRF can be used for a positive screen only that lead-based paint is present. An XRF cannot be used to determine that lead is not present. Negative XRF readings require paint chip sampling and analysis. Inconclusive XRF results are to be treated as positive for the presence of lead. Collect and analyze 5% of the inconclusive XRF readings to verify the presence of lead. Paint is identified as containing lead for construction projects if **any** levels are present as determined by a valid detection limit (use 0.01% as the detection limit). Collect soil and wipe samples as necessary to identify potential lead hazards for the project. Use applicable current ASTM, EPA or HUD guidelines for paint, soil and wipe sample criteria.

3.1.2 Soil Testing

Where the construction site is potentially located on contaminated soil, the design contract may require sampling. The designer shall complete the testing required by the Scope of Work and provide the required results to the Project Manager. The designer will then provide the appropriate design information in the construction documents. For lead, the EPA has designated requirements for

residential real properties or child-occupied facilities. Testing will most likely be performed on these types of facilities.

3.1.3 Waste Characterization Study

Determination of lead painted building components and materials, as hazardous or solid waste for disposal, shall be performed in conjunction with site work. Components that will be demolished and disposed of as part of the project shall be sampled using the Toxicity Characteristic Leaching Procedure (TCLP) for lead in accordance with the provisions of 40 CFR 261, Subpart C.

In order to determine if the lead concentration of the building demolition waste is within regulatory limits for disposal as a non-hazardous material, a representative sample of the waste stream must be analyzed for lead using the TCLP Method. It is sometimes necessary to look at demolition debris as a heterogeneous waste stream comprised of different items, objects, components and materials that are dissimilar in composition. Destructive testing of components is required. Testing includes, but is not limited to collecting subsamples of baseboards, window systems, doors and walls. Collect adequate amounts of subsample materials to provide the requested number of composite samples. The representative composite sample should be prepared from samples of each of the different building material categories, and then mixed in proportion to the percentage by weight of the different components in the anticipated waste stream. Patch and repair occupied areas with suitable materials (joint compound or caulking).

Lead is defined as a hazardous waste when the TCLP extract contains a lead concentration above the Toxicity Characteristic (TC) threshold of 5 parts per million (ppm) or milligrams per liter (mg/L). Leachable lead analysis differs from total lead analysis, as determined by XRF or chip analysis, in that leachable lead is dependent on the type of lead compound present and the size of the particle (i.e. solubility.) Some lead compounds are more leachable/soluble than others. Since the total lead analysis does not determine the specific lead compound present, it is difficult to predict how much of the lead will be leachable.

The EPA has recently determined that residential LBP waste can be managed as household waste. Residential LBP waste is any contractor waste derived from lead abatement, remodeling, or rehabilitation on residential dwellings like single family homes, apartment buildings, row houses, military barracks, or college dormitories. For projects involving these types of facilities, the waste must be indicated as residential and can only be disposed in a municipal solid waste landfill. Determine if State or local governments have more stringent regulations that apply.

4.0 Design Services

4.1 Environmental Basis of Design

The Environmental Section of the Basis of Design shall address all issues that will affect the demolition/renovation/construction project. This section shall include subheadings for all environmental areas that might apply, i.e. Asbestos, Lead in Paint or Materials, PCBs, Mercury-containing lamps, Contaminated Soil and Groundwater, or Tank Removal.

Paint with Lead / Materials containing Lead: Describe all the different scenarios that will be encountered in the project (i.e. “tasks” per OSHA.) Describe how the drawings will provide all the information required for the contractor. Indicate disposal requirements and any special waste segregation that must be done.

Contaminated Soil: Indicate the existence or absence of contaminated soil and source of information. List all reports that contain existing analytical information on the existing site conditions. Describe methodology to protect the construction workers and the environment.

5.0 Environmental Report

An Environmental Report shall be attached to the basis of design and include the following information (as required by the scope of work.)

5.1 Lead Section which:

a) Provides a narrative summary of the site work that identifies the project description, location, previous survey data, additional paint with lead identified, and a description and full characterization of all wastestreams (i.e. hazardous – providing all waste codes, or non-hazardous.) List the areas, types, and location of paint with lead and any contamination that will impact the project.

b) Identifies conditions that affect access or egress for workers and equipment, such as, confined spaces, crawl spaces or elevated working surfaces. Identifies utility systems (HVAC, steam, electrical, etc) which may require shutdown during the project. Note: Where the building is to remain partially occupied by the Government during construction, specifically identify these utility shutdowns to the project manager, in writing.

c) Summarizes state or local laws that affect materials containing lead removal and disposal for the project, such as project size, limitations on removal methods and air monitoring requirements. Includes notification requirements, permit fees, licensing or other specialized requirements.

d) Includes copies of all accreditation certificates, licenses, certificates, sampling plans, and analyses and test reports identified above.

5.1.2 "Other" Testing Section which:

a) Describes the tests performed including site history and analytical methods. Results of testing to characterize soils.

b) Summarizes state or local laws that affect removal of soil, and disposal requirements for the project. State limitations on removal methods and monitoring requirements. Includes notification requirements, permit fees, licensing or other specialized requirements.

5.2 Environmental Calculations

Provide calculations as part of the Environmental Report. Calculations for environmental work include:

a) Relative volume calculations for total wastestream categorization when providing representative amounts of building components for TCLP testing (a total volume of demolition debris shall be calculated and a breakdown of each debris component shall be shown.)

b) Quantities of contaminated soil when unit pricing must be used (typical for all work with contaminated soil and groundwater when the *exact* quantities are unknown.) When contaminated soil or groundwater exist at the site, the designer must provide an initial estimate of the anticipated quantity of these items. The calculations shall include all assumptions made in determining the final estimated quantities.

6.0 Drawings, Specifications and Construction Estimate

6.1 Environmental Drawings and Specifications

All environmental drawings will be labeled as specified. These drawings will be placed before the Civil Drawings in a drawing set. These drawings will indicate all "environmental" type work that must be done on the project. These construction activities include:

Lead Demolition Activities
Lead Paint Removal Drawings and Specifications
Minimal Disturbance of Paint with Lead
Contaminated Soil (May be shown on the Civil Demolition sheets with extent of contamination delineated and appropriate notes.)

6.1.1 Lead Demolition Drawings and Specification

Lead demolition is defined as demolishing and removing any items/building components that are painted with lead. The lead demolition information can be shown directly on the demolition drawings by adding notes indicating that specific items are covered by paint with lead and that demolition activities must be conducted in accordance with Specification Section 13282N, "Lead in Construction." Edit the specification for the appropriate wipe sample clearance criteria. All existing lead levels determined from the field survey must be indicated on the drawings by a chart or some other method to display the laboratory results of the lead analysis. Where lead hazards are required to be abated in housing or child-occupied facilities per EPA or HUD regulations, use Specification Section 13283N, "Removal/Control and Disposal of Paint with Lead". A certified Lead Project Designer must prepare lead removal drawings and specifications for lead hazard abatement projects.

6.1.2 Lead Paint Removal Drawings and Specification

Provide scaled and dimensioned drawings and floor plans or building sections showing all locations and items where paint with lead must be removed. Examples of this include wood molding or steel structures to be salvaged and reused in the finished project, but are coated with lead paint. Indicate all structures, utilities and equipment that hinder access or egress. Provide dimensions for access or egress to crawl spaces or attics or restrictive areas that affect lead removal personnel or equipment. Conduct removal activities in accordance with Specification Section 13283N, "Removal/Control and Disposal of Paint with Lead". Indicate all identified lead levels as a chart or table in the specification and on drawings. Edit the specification for the appropriate wipe sample clearance criteria. A certified Lead Project Designer must prepare lead abatement drawings and specifications where lead hazards are required to be abated in housing or child-occupied facilities per EPA or HUD regulations.

6.1.3 Minimal Disturbance of Paint with Lead

Provide a drawing for projects where there will be minimal disturbance of paint with lead or materials containing lead during construction. Projects involving minimal disturbance of lead (i.e., installation of suspended ceiling when drilling or anchoring into intact painted surfaces, or disturbance of less than 2 square feet of painted surface) require drawing notes only. Wipe sample clearance is not required for minimal disturbance of lead. All existing lead levels determined from the field survey must be indicated on the drawings by a chart or some other method to display the laboratory results of the lead analysis. Where a minimal disturbance of lead will occur, include Specification Section 01525 "Safety Requirements". The drawing note will also reference this Specification Section. Therefore, Specification sections 13282 or 13283 would not apply.

6.1.4 Contaminated Soil

Provide separate Environmental drawings or use civil drawings that indicate the extent of known or suspected soil contamination. Indicate the type and level of contamination and refer to the appropriate specification for instructions on how to handle the contamination.

6.2 Construction Estimate

Include specific data in the construction cost estimate for labor, equipment, and material, insurance, overhead and profit, permit fees, air monitoring, and disposal costs. Cost estimates should include all specialized equipment and materials the contractor may need to perform lead removal, such as scaffolding, lifts, or self-contained vacuum blasting systems. Provide as a separate item, an estimate for independent clearance testing for housing or child-occupied facility projects.

7.0 Design Submittals

7.1 35% Design Development Submittal

Basis of Design-Environmental Contents

Provide information as discussed in Sections 2 through 4 above

Environmental Report and Calculations

Provide the report and calculations as discussed in Section 5 above

Drawings, Specifications, and Cost Estimate

Drawings shall indicate preliminary location of any environmental areas of concern. At least one Environmental drawing shall be started to show the layout of the work. Provide an index of technical specification sections that will be developed. Provide the construction cost estimate identifying specific cost items.

7.2 100% Prefinal Submittal

Revised Environmental Report and Calculations

A revised environmental report shall be prepared based on comments from the 35% submittal, if applicable. Final calculations for all environmental work shall be submitted

Drawings, Specifications, and Cost Estimate

Drawings shall indicate locations of paint with lead or materials containing lead. All existing lead levels determined from the field survey must be indicated on the drawings by a chart or some other method to display the laboratory results of the lead analysis. Edit the appropriate Specification Section and provide cross-reference to the drawing. Provide a revised construction cost estimate as necessary, based on project changes and comments.

7.3 Final Submittal

Final Environmental Report and Calculations

The final environmental report and calculations shall be included with the project specifications.

Drawings, Specifications, and Cost Estimate

The final Environmental drawings must be stamped by a registered architect or engineer. For residential LBP hazard abatement projects, include signature of the Certified Lead Project Designer appropriately licensed in the State where the work is to be accomplished. Provide responses and corrections to prior comments. Provide final construction cost estimate.

8.0 Specialized Requirements

8.1 State and Local Regulations

State or Local regulations regarding lead may require specific licensing, testing, notification, work practice and engineering controls wipe sampling, clearance sampling, or specialized disposal. The designer must research the applicable provisions of these requirements as they relate to the project. Traditional housing renovation projects are not classified as lead-based paint abatement.

8.2 Overseas Final Governing Standards (FGS)

The Final Governing Standards may provide supplemental information on the standards to be used for Navy designs at activities in an overseas location. The A&E shall comply with all requirements of the FGS for the country/host nation where the Activity is located. For projects that are designed to abate lead-based paint hazards in housing or child-occupied facilities, a certified Lead Project Designer must prepare all lead drawings and specifications. If the country has no designer certification requirements then the certification must be from the United States. If the country has designer certification requirements then the lead designer must possess that certification and provide their name on the drawings and specification.

9.0 Post Construction Award Services (PCAS)

Independent technical construction support or clearance testing services may be requested through PCAS. These services generally include providing trained and licensed personnel to perform consultation, inspection, independent air monitoring, clearance sampling or other testing during construction

SCOPE OF WORK
FOR PERFORMING
ASBESTOS AND LEAD SURVEYS
FOR CONTRACT # _____

1.0 GENERAL REQUIREMENTS

1.1 The fee proposal for this project shall include the cost for sampling and analysis of **[_____]** bulk samples by polarized light microscopy (PLM) and the sampling and analysis of **[_____]** paint bulk and wipe samples by atomic absorption spectrophotometry (AA) or anodic stripping voltametry (ASV). Collection and analysis of **[_____]** samples using the toxicity characteristic leaching procedure (TCLP) for lead shall be included in the fee proposal. All labor hours necessary to complete sampling and reports shall be included in the fee proposal. Government will pay for additional sample analysis if necessary based on unit prices. Transmission Electron Microscopy (TEM) analysis of selected bulk materials may be requested by the government. Include in the fee proposal costs for the following analyses based on a quantity schedule:

a. Unit cost for PLM/DS analysis
b. Unit cost for TEM analysis
c. Unit cost for AA or ASV lead analysis
d. Unit cost for TCLP lead analysis

2.0 SAMPLING PLAN

Submit a proposed schedule for sampling including building area, date and time. This schedule is necessary to coordinate access to secured areas and allow advance notice to building occupants. The schedule must be approved by the activity asbestos program manager (APM) or designated representative prior to sampling. Collect samples during the design site work phase. Refer to Enclosure (1) for additional information on sampling protocol. Notify the APM or designated representative when site work will be performed.

2.1 MATERIALS

2.1.1 Asbestos

Identify all friable and non-friable ACM that will be impacted by the project as required by 40 CFR 763 Asbestos Hazard Emergency Response Act (AHERA); 40 CFR 61, Subpart M, National Emission Standards for Hazardous Air Pollutants (NESHAPs); and 29 CFR 1926.1101 OSHA Occupational Exposure to Asbestos in Construction, including but not limited to:

a. All surfacing (spray-applied or troweled-on) materials
b. All thermal system insulation on pipes, boilers and ducts.
c. All miscellaneous forms such as wallboard and joint compound, ceiling tiles, floor tiles and mastic, and any other material suspected of containing asbestos.

Inspections shall be performed by personnel currently maintaining EPA building inspector accreditation. Specific state or local licensing may be required for the project.

Collect 10% duplicate (side by side) samples of difficult matrix materials (such as; floor tile, mastic, wallboard, joint compound, construction mastics, and roofing).

2.1.2 Lead

Evaluate all painted surfaces that will be impacted by the project for lead. If an X-ray Fluorescence (XRF) instrument is used for screening, classify the results as positive, inconclusive or negative according to the EPA Performance Characteristics Sheet for the instrument. Inconclusive results are to be treated as positive for the presence of lead. Negative XRF readings require paint chip sampling and analysis. Collect and

analyze 5% of the inconclusive XRF readings to verify the presence of lead. **Paint is identified as containing lead for construction projects if any levels are present as determined by a valid detection method (Limit of Detection criteria is 0.01%).** Collect soil and wipe samples as necessary to identify potential lead hazards for the project. Use applicable current ASTM, EPA, Title X and HUD guidelines for paint, soil and wipe sample criteria. Personnel conducting site work for residential or child-occupied facilities are required to have, as a minimum, the lead inspector training by an EPA accredited training provider. Personnel conducting site work for non-residential work should have appropriate OSHA lead training. State or local governments may have additional licensing requirements.

2.2 AREAS TO BE SURVEYED

The survey shall include:

a. All areas related to the project in buildings and structures, interior and exterior, where ACM or lead-containing materials could occur (i.e. for asbestos; building spaces, crawl spaces / attics, steam and hot water piping, furnaces, boiler rooms, asbestos insulated duct work, heat exchangers and any other structures, utility lines or equipment insulated with/or suspected of containing asbestos that may become airborne when disturbed through scheduled construction activities).

b. Data on ACM located in inaccessible areas as determined by drawings, field inspection and past or present bulk sample testing for ACM or lead.

2.3 LABORATORY ANALYSIS

In areas where suspect materials have been identified, bulk sample analysis is required to positively confirm the presence of asbestos or lead. Laboratories selected for this analysis shall meet specific accreditation, as well as asbestos and lead identification program participation requirements. Section 2.3 shall be provided to the laboratory selected to perform analysis of all samples. Laboratories used for bulk analysis shall conform to the following:

a. **Sample sets of homogeneous materials for asbestos shall be analyzed until a positive identification of asbestos is made. For example, if Sample #1 of a set of seven is identified as asbestos-containing the other samples are not analyzed and are assumed to contain asbestos since they are the same homogeneous material.**

b. Be accredited by the American Industrial Hygiene Association (AIHA) for asbestos and / or American Association of Laboratory Accreditation (A2LA) for lead.

c. Be accredited by the National Institute of Standards and Technology National Voluntary Laboratory Accreditation Program (NIST/NVLAP) for PLM analysis and the National Lead Laboratory Accreditation Program (NLLAP) and Environmental Lead Proficiency Analytical Testing Program (ELPAT) for paint chip, dust, and soil analysis.

d. All samples collected for asbestos shall be analyzed using polarized-light microscopy with dispersion staining (PLM/DS). Results indicating >1 - 10% ACM are not required to be point counted. These results are accepted as asbestos-containing by the government. The laboratory may supply point counted results at no additional charge.

Results reported as less than 1% asbestos are required to be point counted. A limited number of TEM Analysis may be authorized by the Government to validate some of the negative PLM/DS sample results. Where state or local law requires TEM analysis, analyze samples by PLM/DS first. If results are negative by PLM/DS proceed with TEM analysis.

e. All samples collected for lead shall be analyzed by atomic absorption spectrophotometry (AA) or anodic stripping voltametry (ASV). Limit of detection in paint for construction purposes is 0.01% by weight.

f. Provide evidence of internal statistical quality control (i.e., duplicate, replicate, spikes, and blanks, etc). Provide evidence of external statistical quality control listing interlaboratory QC results, PAT and/or ELPAT, NIST/NVLAP or other laboratory proficiency program results.

g. Provide an acceptable chain-of-custody record for sample handling and data recording.

h. Provide a copy of the laboratory's accreditation with laboratory results.

2.3.1 In addition to the above laboratory requirements, provide the following services:

a. Submit duplicate samples (identified in 2.1.1 above) to another laboratory for quality assurance (QA) analysis.
b. b. Include all laboratory certificates of analyses or test reports, including QA results, as appendices to the report (identified in section 3.0).

2.4 HAZARDOUS WASTE

Determination of components and materials as hazardous or solid waste shall be performed in conjunction with site work. Components which will be demolished and disposed as part of the project shall be sampled using the toxicity characteristic leaching procedure (TCLP) for lead in accordance with the provisions of 40 CFR 261, Subpart C. Destructive testing of components is required. Testing includes, but is not limited to collecting subsamples of baseboards, window systems, doors, and walls. Collect adequate amounts of subsample materials to provide 3 composite samples. Patch and repair occupied areas with suitable materials (joint compound or caulking). Four ounces (110 grams) of material is required for a composite of subsamples. Subsamples shall be proportioned to components identified for disposal. When decontamination procedures of drill bits or core tools are performed, a rinse water sample shall be submitted for TCLP lead analysis. Enclosure (2) provides additional guidance on sample collection and analytical results.

3.0 REPORT

3.1 Submit a report in accordance with the A/E guide for performing services. In addition, the report shall include:

- Name and certificate/license number of building inspector(s).
- Copy of current certificate/license
- Copy of testing laboratory accreditation
- Copy of all laboratory certificates of analysis, including QA results
- Copy of Asbestos Project Designer accreditation (for design specifications) for asbestos projects

Field Sampling Procedures:

a. Bulk sampling shall conform to current requirements of applicable established Environmental Protection Agency (EPA) 40 CFR 763 AHERA guidelines; 40 CFR 61 Subpart M; Occupational Safety and Health Administration (OSHA) 29 CFR 1926.1101; EPA-560/5-85-030A Asbestos in Buildings-Simplified sampling scheme for surfacing materials; EPA-560/5-85-024 Guidance for Controlling Asbestos-containing Materials in Buildings.

b. Comply with all safety and health requirements set forth in OSHA Standard 29 CFR 1910.1001, 29 CFR 1926.1101, 29 CFR 1910.1025 and 29 CFR 1926.62.

c. Repair all suspected ACM and painted surfaces disturbed for sampling purposes to maintain the integrity of the area. Use colored or tinted encapsulants to indicate repairs.

d. Perform sampling in such a way as not to endanger the health of personnel working in the area by ensuring that asbestos fibers or lead dust will not be released during the sampling process. **Sampling in occupied administrative areas shall be performed after normal working hours unless approved by the activity APM or designated representative.**

e. Label each sample and location with a unique sample ID number. This number shall also be on the sampling container sent to the laboratory for analysis. Record the ID number and the sample location on a sampling area sketch (see U.S. EPA Document 560/5-85-030a for guidance on sketches required) and in a chain of custody log or survey form. Provide descriptive location information, such as floor, column and room numbers, to assure rapid identification at any future time by Naval personnel.

f. Take reasonable measures (such as closing doors) to secure an area which is found to be an imminent hazard. Notify the activity APM or designated representative immediately of the imminent hazard. The activity APM or designated representative will notify the appropriate authority.

g. Planning, monitoring and directing the survey should be under the direction of an American Board of Industrial Hygiene (ABIH) Certified Industrial Hygienist (CIH), or Certified Safety Professional (CSP) trained and qualified in asbestos and lead sampling and control work. The CIH, CSP or other qualified person and those working under his direction on the project, shall have completed an EPA approved training course for Building Inspector and shall have passed the course examination. Documentation of lead inspector training shall also be required. The Contractor shall provide proof of compliance by submitting the name, address, telephone number, a copy of the CIH's or CSP's-in-Charge certification (or Qualified Person's training documentation), and evidence of the successful completion of the EPA and/or State course and examination prior to beginning work on the project. Copies of the training certificates of those working on the project under the direction of the CIH, CSP, or Qualified Person are also required prior to starting work at the site. No work will be authorized without prior approval and receipt of the required certifications.

ENCLOSURE (2)

Waste Characterization:

a. Determine waste streams for the project which will identify waste for disposal. Building components which will be classified as debris shall be sampled to determine whether the waste will be hazardous or solid.

b. Segregate and sample building components by type (doors, windows, etc) in accordance with 40 CFR 261. The most common components for sampling are wood, wallboard, plaster, cement and brick. Building components, such as glass, wiring, aluminum siding, piping, or other recyclables shall not be included in the composite. Submit a single composite sample, consisting of subsamples from a building for TCLP lead analysis for building demolition projects. Submit single composite samples of building segregated components (doors or windows, etc) for renovation projects. Toxic substances (suspect asbestos, light ballasts, and transformers) shall be sampled and handled separately.

c. Calculate the total volume of components identified for disposal prior to sampling. Surface area (square feet) times component thickness provides cubic feet dimensions. Convert to cubic yards to identify the volume of each component for disposal. Calculate the total volume of debris adding the volume of each component. Collect subsamples of each component in a proportional ratio to the total volume.

d. Collect subsamples of individual components by using clean drill bits or other similar coring tools. Clean polyethlyene, paper or a similar material shall be placed below the sampling area during collection. Remove residual dust, shavings and materials on the collection device and include with the subsample. Transfer the subsample material (eg- drill shavings) to a clean container, such as an unused self-sealing plastic bag or clean plastic or glass container. Wood shavings or pulverized masonry provide the best materials for analysis and minimize additional laboratory preparation or bias. Number, identify and record each subsample.

e. Decontaminate or dispose of drill bits or coring tools when a different component is to be sampled. Several subsamples of the same component may be collected prior to decontamination. Decontamination shall consist of brushing the bit or coring tool with tap water and soap. Final rinse shall be done with distilled, deionized, filtered (DDIF) water. Collect and submit the final rinse water, designated as a rinsate blank, for a quality control sample.

f. Submit a composite sample for analysis by combining proportionate amounts of each subsample. The composite sample shall be approximately 4 ounces(110 grams) and be representative of all subsamples. Hold remaining subsamples for additional analysis, if required.

g. If results of TCLP analysis are <5 mg/kg (ppm) of lead the waste is identified as a non-hazardous solid. No further analysis is required. Hold subsamples for further disposition or return to the government.

h. If results of TCLP analysis are >5 mg/kg (ppm) of lead an additional analysis shall be required. Compare subsamples to initial lead survey results. Components which were initially identified as <u>low content of lead</u> (XRF or paint chip) shall be included in the second composite. If the result of the second TCLP analysis is <5 mg/kg (ppm) the subsampled components shall be identified as solid waste. Subsampled components <u>NOT submitted shall be identified as hazardous waste.</u>

i. For total building demolition projects, core samples of the entire building thickness are required. Follow the above procedures as required for waste characterization.

Government Editing Instructions and Cost Guidance for Asbestos / Lead Scope of Work

EDITING INSTRUCTIONS

BULK SAMPLES FOR ANALYSIS (Edit A/E Scope of Work in Gen Reqmts)
Asbestos and Lead Paint chip samples are calculated using the same formula. Assumptions are:

A. An X-Ray Fluorescence (XRF) meter is not being used.
B. No previous asbestos survey data is available.

Number of samples for **each** is estimated by the following:

1. Determine Total Square Footage of building(s) in project
2. Divide Total Sq Ft by 400 (Assumes 1 sample per 400 sq ft)
3. Round up to nearest 10.

EXAMPLE: Housing modernization project of 100 units @ 950 sq ft/ea
Total Sq Ft = 95,000
Divide by 400 = 237.5 samples
Number of Samples = 240 (for asbestos and 240 for lead)

NOTES:

1. If an activity asbestos survey has been conducted, or building involved has similar rooms throughout (BEQ, BOQ) the number of samples should be reduced by 50%. In the above example, samples would be reduced to 120 each.

2. A building demolition would **ADD** 10 - 20% to the original total of 240 (i.e. 265 - 290) for Asbestos samples only.

3. If an XRF meter is used to screen positive and inconclusive (assumed positive) lead paint reduce the number for paint chips by 50%.

HAZARDOUS WASTE DETERMINATION
Determination of Hazardous Waste should be performed in conjunction with the Site Work phase of a project where building component disposal or demolition debris will be generated. This characterizes the types of waste which will result (hazardous vs. solid) to develop the estimated construction cost. Destructive testing of components (drilling holes in baseboards, window systems, etc) is necessary. Typically 4 ounces (115 grams) of material is needed for a sample. Enough subsample materials should be collected as composites to produce 3 samples. An additional sample of rinse water is also collected from the decontamination of sampling equipment for quality control purposes.

The initial TCLP sample includes subsamples of all components for demolition and disposal.

COST GUIDANCE

Labor Effort

Survey (Site Work) with Design Effort is calculated at a rate of 7,500 sq ft / day for a 2 person team. This assumes some knowledge of site/building conditions, such as year built, scope of project work, and any previous asbestos or lead results. Site Work ratios are 1 IH to 3 IH Techs, or 1:1 for smaller projects. Asbestos/lead report preparation is calculated at 50% of the technical Site Work labor effort.

Certified Industrial Hygienist(CIH)/Certified Safety Professional (CSP)/Qualified Person(QP) provides Proj Mgmt oversight, technical guidance and review/signature of final report. Project Management for the asbestos/lead site work is estimated at 10% of the technical labor effort hours.

Specification Section editing by Designer: 6 hrs for 13281 and 8 hrs for 13283.

Site Work labor is estimated by the following:

1. Determine Total Sq Ft of building(s) in project
2. Divide Total Sq Ft by 7,500 Sq Ft/Day
3. Round up to nearest Day

Example:

100 units @ 950 Sq Ft/ea for modernization/repair.
95,000 Total sq ft Divided by 7,500 sq ft/day = 12.6 days
Number of Days = 13 X 2 person team = 26 days (Site Work)
Report Prep @ 50% of Site Work = 13 days
Site Work and Report Prep = 39 days
Asbestos @ 39 days + Lead @ 39 days = 78 days TOTAL Labor

Personnel Hourly Rates:

CIH/CSP/QP - $60 - 75 (Similar to Technical Proj Mgr)
IH/ENGR - $30 - 45 (On-site Coord & Supervision)
IH Tech - $25 - 30 (Inspection & Sample Collection)
Proj Des- $35 - 45 (Reqd for Asbestos Spec Section)

Sample Analysis (Cost for sample collection is in Labor Effort)

PLM - $8 - 12 (Point Counting add $20/sample)
TEM - $80 - 125 (air or bulk)
AA - $8 - 12 (paint chip, wipe or soil for lead)
TCLP - $70 - 125 (Lead ONLY)

XRF Rental (Averaged at weekly rates only)

Weekly Rental - $900- 1,000
Own/Operate - $600-800 /week

Waste Characterization Effort

This effort is labor intensive due to calculation of volumes of components and sample set up and collection. Sample collection is project dependent, such as replace windows and doors versus total modernization and repair. Typically allow 1-3 days for sample collection depending on size of project. Assume 2 person team to perform sample collection. Sample collection costs are included in the labor and analytical costs are for TCLP analysis. Allow 50% of the labor effort for report preparation.

Other Direct Costs are standard such as Per Diem, Clerical, Printing & Shipping.

APPENDIX B

Asbestos / Lead Resources &Web sites

Federal Web sites & Info

www.osha.gov -- Contains Asbestos (29 CFR 1926.1101) and Lead (29 CFR 1926.62) regulations, interpretations, and compliance directives. Compliance directives explain how a compliance officer performs an inspection and gives more detailed explanations about the regulations.

www.osha-slc.gov/dts/osta/oshasoft -- OSHA Expert Advisor software. The OSHA advisor series are "expert systems" that will provide responses based on questions you answer as a building owner. Both asbestos and lead advisors are available for downloading. OSHA Technical Manuals are included, which contains comprehensive discussions of regulations.

www.epa.gov/opptinr/asbestos-- EPA asbestos home page that contains regulations, information, documents and links to other sites.

Phone ONLY (202) 554-1404 Toxic Substance Control Act (TSCA) & Asbestos Info Service

www.epa.gov/lead --EPA's primary site for lead information with links to other related sites.

http://www.hud.gov/lea/leahome.html --HUD Office of Lead Hazard Control has access to several lead regulations, HUD Guidelines, Fact Sheets and other information pertaining to Housing and lead hazards

DoD Web sites

www.denix.ods.mil/denix -- DoD subscriber web site with daily environmental updates, topical indexes, primarily focused on environmental programs. Contains links to other web sites

www.dscr.dla.mil/htis/htis.htm Phone (800) 848-4847 DSN 695-5168
Hazardous Technical Information Services Bulletin web site designed for DoD technical and regulatory developments in managing hazardous materials and wastes

Navy Web sites

http://enviro.nfesc.navy.mil/esc425/NoshArBr.htm - - Naval Facilities Engineering Service Center NAVOSH Indoor Air Branch provides technical support to activities, EFD/A's, PWC's for asbestos, lead, ventilation, and other indoor air hazards. Indoor Air Monitor is a quarterly publication from NFESC to subscribers providing information updates, answers to technical questions about asbestos, lead, ventilation and other indoor air hazards

http://www.norva.navy.mil/navosh/ -- NAVOSH Environmental Training Center provides EPA accredited asbestos training courses and other safety, health and environmental training

Additional Sources

www.astm.org -- American Society for Testing and Materials contains information regarding consensus standards. Various sampling, inspection and analytical methods are included.

www.nibs.org -- National Institute of Building Sciences provides consensus documents for lead and asbestos Operations and Maintenance work practices.

APPENDIX C

Asbestos / Lead Points of Contact

APM = Asbestos Program Manager ***A = Asbestos*** ***L = Lead***

NEW ENGLAND AREA

NCTS Cutler, ME

(Vacant)	DSN 476-
	Com (207)

NSG Winter Harbor, ME

Jim Miller, Env (A)	DSN 476-9458
jmmille@nsgawh.navy.mil	Com (207) 963-5534 x-458

NAS Brunswick, ME

Carla Sanders, Fac Mgmt (APM / A / L)	DSN 476-1708
sanders@nasb.navy.mil	Com (207) 921-1708

NSY Portsmouth, NH

Chuck Vaughan	DSN 684-2957
vaughancf@mail.ports.navy.mil	Com(207) 438-2957
IH for NavFac Proj Reviews—Jim Braun	DSN 684-1807
(All ME activities)	Com (207) 438-1807

NETC Newport, RI

Activity—Dave Beamer, Safety (APM)	DSN 948-7603
beamerd@nsnpt.navy.mil	Com (401) 841-7603
Activity—Moore Debra, Env (L)	DSN 948-1790
moored@nsnpt.navy.mil	Com (401) 841-1790
	Fax (401) 841-7071
IH for NavFac Proj Reviews—Ray Roberge	DSN 948-6170
Navy Ambulatory Care Clinic (NACC)	Com (401) 841-6170

NUWC Newport, RI

Scott Patton, Env (APM)	DSN 920-5874
pattonsl@npt.nuwc.navy.mil	Com (401) 832-5874

SUBASE New London, CT

Rich Massad, Env (APM / A / L)	DSN 694-5140
massadr@subasenlon.navy.mil	Com (860) 694-5140
Jack Mahoney, ROICC	DSN 694-4567
Dave Hickman, IH Dept	DSN 694-2565
IH for NavFac Proj Reviews—Ted Meleny	DSN 694-2560

MID-ATLANTIC

NWS Earle, NJ

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dsmith@earle.navy.mil	Com (732) 866-2785
Larry Burg (L)	DSN 449-2621
lburg@earle.navy.mil	

Gil Clouser, IH Branch Clinic (NavFac Proj Review)	DSN 449-2305

NAWC Lakehurst, NJ

Gordon Mason, Safety (APM / A)	DSN 624- 2524
masonge1@navair.navy.mil	Com (732) 323-2524
	Fax (732) 323-2659
Peter Kurtz, IH Branch Clinic (NavFac Proj Review)	DSN 624-1822

NSWC Phila

Tom Egan, Env (APM /A)	DSN 443-7025
egantj@nswccd.navy.mil	Com (215) 897-7025
IH for NavFac Proj Reviews—Martin Dubin	DSN 443-6115

NAVICP Phila, PA

Activity—Herb Slack, Safety	DSN 443-
	Com (215) 697-
IH for NavFac Proj Reviews—Trina Redford	Com (215) 897-6120
NAVICP Phone	Com (215) 697-5665

NAS/JRB Willow Grove, PA

Jack Fox, Env(APM /A)	DSN 991-2108
foxjt@cnrf.navy.mil	Com (215) 773-2108
Steve Hart, IH Branch Clinic (NavFac Proj Review)	DSN 993-2160

NavSta / NAVICP Mechanicsburg, PA

Paul Scarberry, Safety (APM / A)	DSN 430-4867
	Com (717) 605-4867
IH for NavFac Proj Reviews--Tom Bourgeois	DSN 430-2636 or 3461
	Com (717) 605-2636

Commander Navy Region Northeast Groton, CT

Linda Worboy, Env (A)	DSN 694-2084
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EFANE NavFacEngCom

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Angelo Marchiano, Env (A / L)	DSN 443-0567 x150
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PWC PHILA Detachment

Marge Johnston, Env (A / L)	DSN (215) 897- 2035

LANTDIV NavFacEngCom Norfolk

Terry Knight, Env (APM /A)	DSN 262-4738
Susan Hauser, Design (A / L)	DSN 262- 4301
	Com (757) 322-

NavFacEngCom HQ

Kent Avery, Env (A / L)	DSN 325-9322
Joe Gott, Safety--OPS (A)	DSN 325-9323
Craig Collins, Housing (A / L)	DSN 325-9432
	Com (202) 685-

NFESC NavFacEngCom Pt. Hueneme, CA

Jill Hamilton (A / L)	DSN 551-4892
Dave Chavez (A / L)	DSN 551-5314
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APPENDIX D

Abatement - Asbestos	Control of asbestos beyond an operations and maintenance program that includes removal, enclosure, and encapsulation techniques.
Abatement - Lead	A measure or set of measures designed to permanently eliminate lead-based paint hazards or lead-based paint. Abatement includes: the removal of paint and dust, the permanent enclosure or encapsulation of LBP, the replacement of painted surfaces or fixtures, or the removal or permanent covering of soil, when LBP hazards are present. Abatement also includes all associated preparation, cleanup, disposal and post-abatement clearance testing.
ACM or ACBM	Asbestos-Containing Material or Asbestos-Containing Building Material. Any material containing more than one percent asbestos.
Action Level (AL) - Lead	An employee exposure, without regard to the use of respirators, to an airborne lead concentration of 30 micrograms per cubic meter calculated over an eight-hour time weighted average.
Adequately Wet	Sufficiently mix or penetrate with liquid to prevent the release of particulates or fibers. If visible emissions are observed coming from ACM, then that material has not been adequately wetted. However, the absence of visible emissions is not sufficient evidence of being adequately wet.
AHERA	Asbestos Hazard Emergency Response Act. An EPA regulation, 40 CFR 763, published 1987. AHERA requires all schools (K-12) to inspect and identify ACM their buildings, and develop and implement an asbestos management plan. In 1990, the reauthorization of the act extended training requirements to include personnel in public and commercial buildings.
Air Monitoring	The process of measuring the asbestos fiber or lead content of a specific volume of air.
APM	Asbestos Program Manager. An activity representative who supervises all aspects of the asbestos management control program.
Asbestos	Chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos and any of these minerals that have been chemically treated and/or altered.
Building Component	Any architectural element of a building that may be painted or have dust on its surface, e.g. walls, stair treads, floors, railings, doors, window sills, etc.
Child-Occupied Facility	A building, or portion of a building, constructed prior to 1978, visited regularly by the same child, 6 years of age or under, on at least two different days within any week, provided that each day's visit lasts at least 3 hours and the combined weekly visit lasts at least 6 hours, and the combined annual visit lasts at least 60 hours.
CIH	Certified Industrial Hygienist. A person who has passed the 2-day certification exam of the American Board of Industrial Hygiene, and who has at least 4 years of experience in industrial hygiene and a graduate degree or a total of 5 years of experience.
Class I Asbestos Work	Activities involving the removal of thermal system insulation or surfacing ACM/PACM.
Class II Asbestos Work	Activities involving removal of ACM which is neither TSI or surfacing ACM. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.

Class III Asbestos Work	Repair and maintenance operations, where any ACM may be disturbed.
Class IV Asbestos Work	Maintenance and custodial activities during which employees contact ACM and PACM, and activities to cleanup waste and debris containing ACM and PACM.
Clearance	Visual examination and collection of environmental samples by an inspector or risk assessor, and analysis by an accredited laboratory upon completion of an abatement project, interim control intervention, or maintenance job that disturbs asbestos or LBP.
Competent Person - Asbestos	One who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure. Additionally, a person who is specifically trained in a training course which meets the criteria of EPA's Model Accreditation Plan for project designer or supervisor, or its equivalent.
Competent Person - Lead	One who is capable of identifying or predicting hazardous working conditions and work areas, and who has authorization to take prompt, corrective measures to eliminate the hazards. A competent person is not necessarily a risk assessor, inspector, or abatement project supervisor.
Compliance Plan	A document that describes the types of tasks, workers, protective measures, tools, and other materials that may be employed in lead-containing paint hazard control to comply with the OSHA Lead Exposure in Construction standard.
Construction Work	Any work for construction, alteration, and/or repair, including painting and decorating.
Containment	A process to protect workers and the environment by controlling exposures to asbestos fibers or lead-contaminated dust and debris created during abatement.
CSP	Certified Safety Professional. A person who has passed the 2-day certification exam of the Board of Certified Safety Professionals, and who has at least 4 to 7 years experience in safety and an Associate in Safety or Bachelors degree.
Decontamination	Cleaning of contaminated areas, equipment, and personnel. Decontamination chambers include a clean room, and a dirty (contaminated) room, with a shower facility in between.
Encapsulation	The treatment of ACM with a material that surrounds or embeds asbestos fibers in an adhesive matrix to prevent the release of fibers, as the encapsulant creates a membrane over the surface (bridging encapsulant), or penetrates the material and binds its components together (penetrating encapsulant).
ELPAT	Environmental Lead Proficiency Analytical Testing. A quarterly performance based testing program for paint, soil, dust, and air samples. Laboratories participate to assess and improve their analytical skills for lead analysis.
Engineering Controls	Measures other than respiratory protection or administrative controls that are implemented at the work site to contain, control, and/or otherwise reduce exposure to lead-contaminated dust and debris, usually in the occupational health setting. The measures include process and product substitution, isolation, and ventilation.
Exposure Monitoring	The sampling and analysis of air both inside and outside the work area to determine the degree of worker and resident exposure to lead or other airborne contaminants, often involving air sampling inside a worker's breathing zone.
Friable	Any material which, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. This may also include previously non-friable material

which becomes broken or damaged by mechanical force.

Generator Any person whose act or operation produces hazardous waste identified or listed in 40 CFR Part 261 or whose act causes a hazardous waste to come under regulation (40 CFR 260.10).

Hazardous Waste As defined in EPA 40 CFR 261.3, hazardous waste is a solid waste or a combination of solid wastes that because of its quantity; concentration; or physical, chemical, or infectious characteristics may cause or significantly contribute to increases in mortality, serious and irreversible or incapacitating but reversible illnesses, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed. For lead-based paint abatement waste, HW is waste that contains more than 5 ppm of leachable lead as determined by the TCLP test, or is waste that is corrosive, ignitable, or reactive and not otherwise excluded.

HEPA Filter High-Efficiency Particulate Air Filter. Such filters are rated to trap at least 99.97% of all particles 0.3 microns (0.3 μm) in diameter or larger.

Housing/Target Housing Any housing constructed prior to 1978, except housing for the elderly or persons with disabilities (unless any one or more children age 6 years or under resides in such housing for the elderly or persons with disabilities) or any 0-bedroom dwelling.

Industrial Hygienist A professional qualified by education, training, and experience to anticipate, recognize, evaluate, and develop controls for occupation health hazards.

Inspector - Asbestos An individual who has completed an EPA/AHERA accredited training program. An inspection includes those activities undertaken to specifically determine the presence or location, or to assess the condition of, friable or non-friable ACM or presumed ACM

Inspector - Lead An individual who has completed an accredited training program and is licensed or certified by the appropriate State or local agency to: (1) perform inspections to determine and report the presence of LBP on a surface-by-surface basis through onsite testing; (2) report the findings of such an inspection; (3) collect environmental samples for laboratory analysis; (4) perform clearance testing; and (5) document successful compliance with LBP hazard control requirements or standards.

Landfill A State-licensed or permitted disposal facility that meets municipal solid waste standards (40 CFR 268).

LBP Lead-Based Paint. Any paint, varnish, shellac, or other coating that contains lead equal to or greater than 1.0 milligram per square centimeter (mg/cm^2) as measured by x-ray florescence (XRF) or laboratory analysis, or 0.5% by weight (5,000 μg/g, 5,000 ppm, or 5,000 mg/kg) as measured by laboratory analysis. (Local definitions may vary.)

LCP Lead-containing Paint. Paint with any detectable concentration of lead is referred to as "lead-containing paint" in this PWO Guide, to indicate when OSHA standards apply. This differs from the CPSC definition for consumer use; that is, paint or other surface coating material containing lead or lead compounds, where the lead content (calculated as lead metal) exceeds 0.06% by weight (600ppm) of the dried paint film.

Lead Includes metallic lead and inorganic and organic compounds of lead.

Medical Surveillance A periodic comprehensive review of a worker's health status. The required

	elements of an acceptable medical surveillance program are listed in the OSHA standards for asbestos and lead.
µg or Micrograms	The prefix micro- means 1/1,000,000 (or one-millionth); a microgram is 1/1,000,000 of a gram and 1/1,000 of a milligram.
mg or Milligram	The prefix milli- means 1/1,000; a milligram is 1/1,000 of a gram.
NESHAP	National Emission Standard for Hazardous Air Pollutants. EPA Rules under the Clean Air Act, 40 CFR 61 Subpart M. The Asbestos NESHAP is intended to minimize the release of asbestos fibers during renovation, demolition, and disposal activities.
NLLAP	National Lead Laboratory Accreditation Program. Requirements, specified by the EPA, for accreditation for the lead analysis of paint, soil, and dust matrixes.
NVLAP	National Voluntary Laboratory Accreditation Program. Third party accreditation program administered by the National Institute of Standards and Technology (NIST). 15 CFR 285 establishes accreditation criteria, which includes the PLM Test Method and TEM Test Method.
Non-Friable	Any material which, when dry, cannot be broken, crumbled, pulverized, or reduced to powder by hand pressure.
Owner	A person, firm, corporation, guardian, conservator, receiver, trustee, executor, government agency or entity, or other judicial officer who, alone or with others, owns, holds, or controls the freehold or leasehold title or part of the title to property, with or without actually possessing it. This definition includes a vender who possesses the title, but does not include a mortgagee or an owner of a reversionary interest under a ground rent lease.
PACM	Presumed Asbestos-Containing Material. Materials assumed to contain asbestos but not laboratory tested.
Paint Removal	An abatement strategy that entails the removal of lead-based paint from surfaces. For lead hazard control work, this can mean using chemicals, heat guns below 1,100 °F, and certain contained abrasive methods. Open flame burning, open abrasive blasting, sandblasting, water blasting, and extensive dry scraping are prohibited paint removal methods. (Methylene chloride paint removers and dry scraping are also not recommended.)
PEL - Asbestos	Permissible Exposure Limit. Airborne fiber concentration limit of 0.1 fiber per cubic centimeter of air as an eight hour time weighted average.
PEL - Lead	Airborne lead concentration limit of 50 $\mu g/m^3$ calculated as an eight hour time weighted average
PLM	Polarized Light Microscopy. A method of analysis using a light microscope to find the chemical or mineral types of samples, including the concentration of asbestos in bulk materials. Used by EPA for AHERA and NESHAP, and by OSHA to see if asbestos is involved in a project.
Project Designer - Asbestos	An individual who has completed EPA/AHERA accredited training on planning and designing asbestos abatement projects and response actions.
Project Designer - Lead	An individual who has completed an accredited training program on planning and designing lead-based paint abatement projects.
Quality Assurance (QA)	An integrated system of activities involving planning, quality control, quality assessment, reporting, and quality improvement to ensure that a product or service meets defined standards of quality within a stated level of confidence.

Quality Control (QC)	The overall system of technical activities whose purpose is to measure and control the quality of a product or service so that it meets the needs of users. The aim is to provide a level of quality that is satisfactory, adequate, dependable, and economical.
RCRA	Resource Conservation and Recovery Act. The primary Federal statute governing waste management from generation to disposal. RCRA defines the criteria for hazardous and non-hazardous waste.
Regulated Area - Asbestos	An area where Class I, II, and III asbestos work is done, and any adjoining area where debris and waste from such work accumulate.
Regulated Area - Lead	Designated area where lead airborne concentration may exceed the action level.
Risk Assessor	An individual who has completed an accredited training program and is certified to: (1) perform risk assessments; (2) identify acceptable abatement and interim control strategies for reducing LBP hazards; (3) perform clearance testing and reevaluations; and, (4) document the successful completion of LBP hazard control activities.
Target housing	Housing constructed prior to 1978; except housing for the elderly or persons with disabilities (unless a child who is less than 6 years of age resides or is expected to reside in such housing), and any 0-bedroom dwelling.
TCLP	Toxicity Characteristic Leaching Procedure. A laboratory test to determine if excessive levels of lead or other hazardous materials could leach from a sample into groundwater; usually used to determine if waste is hazardous based on its toxicity characteristics.
TEM	Transmission Electron Microscopy. Use of an electron microscope to find and analyze the concentration of airborne or bulk asbestos fibers and structures. Distinguishes among asbestos and other materials. Used to determine clearance levels.
WSR	Waste Shipment Record. The shipping document, originated and signed by the waste generator, used to track and substantiate the disposition of asbestos-containing waste material.
XRF Analyzer	X-ray Fluorescence Analyzer. An instrument that determines lead concentration in milligrams per square centimeter (mg/cm^2). The two types of XRF analyzers used are, direct readers and spectrum analyzers. The term XRF analyzer only refers to portable instruments manufactured to analyze paint, and does not refer to laboratory-grade units or portable instruments designed to analyze soil.